ERNEST BORN



THE ARCHITECTURAL RECORD

1936

6

NEW SCHOOL PLANNING AND EQUIPMENT

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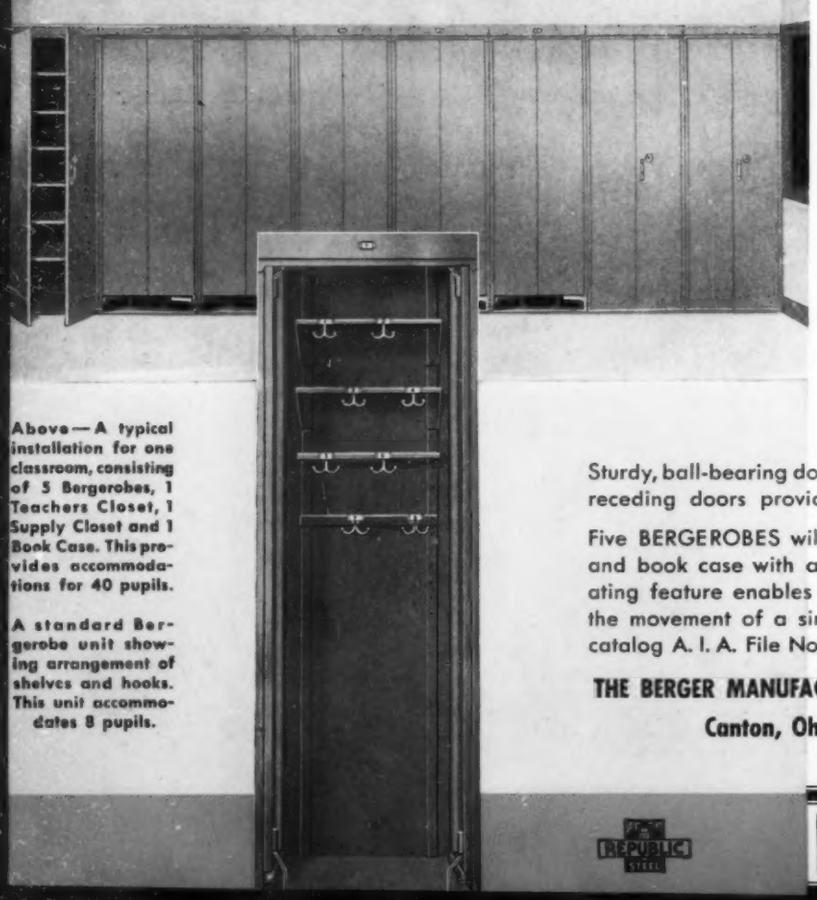
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THE

ARCHITECTURAL RECORD

VOLUME 79 NUMBER 6 JUNE, 1936

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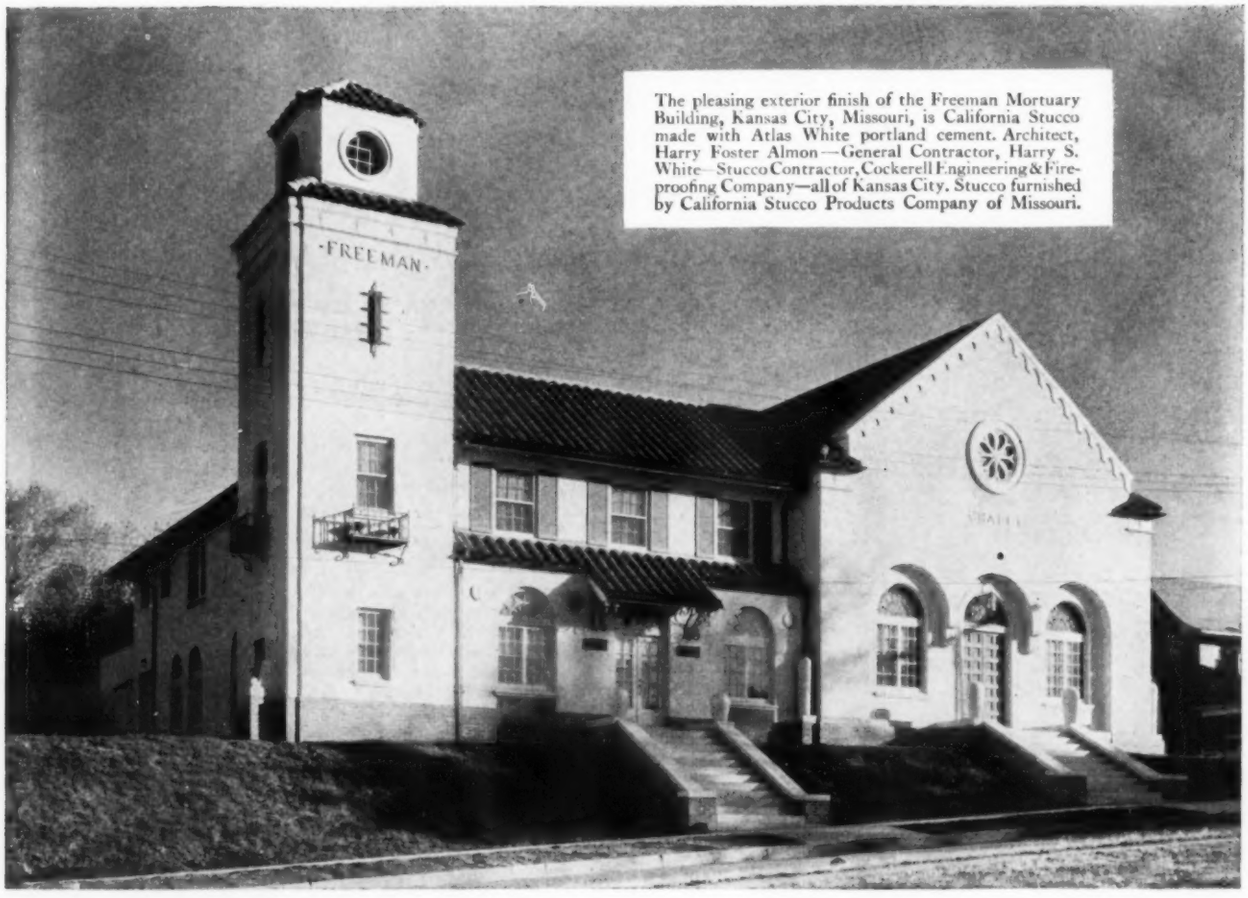
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Our Hat is off TO THIS NICE JOB



The pleasing exterior finish of the Freeman Mortuary Building, Kansas City, Missouri, is California Stucco made with Atlas White portland cement. Architect, Harry Foster Almon—General Contractor, Harry S. White—Stucco Contractor, Cockerell Engineering & Fireproofing Company—all of Kansas City. Stucco furnished by California Stucco Products Company of Missouri.

ARCHITECT Harry Foster Almon designed this beautiful mortuary. We present it here as an excellent example of exteriors which architects and builders are achieving with stucco made with Atlas White portland cement. Consider some of the advantages that *White* Cement Stucco offers:

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STUCCO MADE WITH **Atlas White** PORTLAND CEMENT

THE ARCHITECTURAL RECORD

VOLUME 79 • NUMBER 6 • JUNE 1936

• NEXT • MONTH •

For most popular games international competition has done much to fix standard horizontal dimensions for the playing areas. However, except in a few cases, nothing has been done to establish standard vertical dimensions for the headroom over these areas. Almost every game requires a particular headroom, which is not necessarily uniform over the entire floor area. If the designer provides too little headroom the usefulness of the unit is destroyed; if he provides too much, needless cost is incurred. Mr. Gavin Hadden draws upon fifteen years of experience as an engineer designer of indoor and outdoor play areas to present in plan, section or elevation, and perspective the space actually required for participation in recreational activities, including tennis, badminton, paddle tennis, basketball, swimming pools with high and low springboard diving, hockey, ping pong, billiards, bowling, pole vaulting, etc. Mr. Hadden also points out how the shapes of the clearance solids influence the structural design of recreation buildings.

The semi-annual index, covering the contents of numbers 1 to 6, volume 79, will appear in the July issue.

NEWS OF THE MONTH



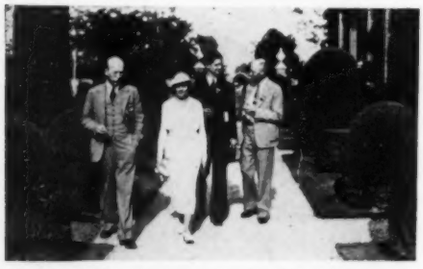
"FOR HIS VISION, DIRECTION AND GENerosity" in restoring Williamsburg to its Colonial splendor, John D. Rockefeller, Jr., was presented this testimonial by A.I.A. president, Stephen F. Voorhees.



ARTHUR B. HEATON, PRESIDENT, WASHington chapter, inspects the topiary in the garden of the Governor's Palace with Theodore I. Coe, also of Washington.



REELECTED PRESIDENT VOORHEES CAUGHT with William G. Perry and Thomas Shaw, of the firm of Perry, Shaw and Hepburn, architects for the Restoration; Louis LaBeaume, St. Louis, A.I.A. first vice-president, is seen on the extreme right.



PITTSBURGHERS VIEW THE PALACE GARdens: chapter president, Raymond M. Morlier with Mrs. Morlier, followed by Charles M. Stotz, former chapter president and Charles T. Ingham, Institute Secretary.

A.I.A. CONVENES IN WILLIAMSBURG

In the romantic setting of the Williamsburg Restoration, the American Institute of Architects met May 5-8 in its sixty-eighth convention. Besides members of the Institute were builders, producers of construction materials, members of allied arts and student delegations from twenty-six schools of architecture. Discussions covered "world problems in the field of domestic shelter, the future of the architectural profession in the United States and the relationship of architects with government and industry."

The setting of the convention largely set its keynote. John D. Rockefeller, Jr., who made the Restoration possible, was presented a testimonial by the Institute. Of Mr. Rockefeller, William Perry, senior member of the firm which supervised the Restoration, said "there was no American to whom the architectural profession might turn with more kindly feeling." Vernon M. Geddy, of Colonial Williamsburg, Inc., described the method by which high prices were avoided in acquiring land. Secrecy, in which the aid of the press was invaluable, surrounded all operations until the land purchase was complete.

CONTINUANCE OF WORK RELIEF

Expenditure of a "reasonable" amount of work relief money for permanent improvements was asked of President Roosevelt in a letter from the Board of Directors. "Such action would give employment to those groups and individuals in the building industry who are now maintaining themselves independently in private work. For the immediate future they are in real need of work which will arise from Federal aid to permanent projects."

FOR HOUSING: A DOUBLE STANDARD

Housing occupied an important position in the convention. In a letter in which he regretted his absence, President Roosevelt said that "the architects could render great service in this field. Is not housing," the President asked, "the greatest potential market for the unused resources and idle facilities of our mines, forests, factories and railroads?" But a report by the Institute's Committee on Housing warned that housing "must be attacked primarily as a social problem and not as a means of stimulating industry or reducing unemployment."

The Report said that the Wagner Bill indicated "a possible government pro-

(Turn to page 420)



TWO MEDAL WINNERS RECEIVE AWARDS from President Voorhees. John Joseph Early (left), architectural sculptor, Washington, gets craftsmanship award for "original work in application of color to masonry"; Robert Edmund Jones (right), New York designer, recognized for "conspicuous attainment as a designer for the theater."



A.I.A.'s BOARD OF GOVERNORS ON THE steps of the Williamsburg Inn. Front row (left to right): first vice-president, Louis LaBeaume, St. Louis; Mr. Rockefeller; president, Stephen F. Voorhees, New York; treasurer, Edwin Bergstrom, Los Angeles, Calif.



IN THE SUNNY PALACE GARDENS ARE seen John R. Fugard, Chicago, with N. Max Dunning and G. W. Murchison, Jr., of Washington.



HOBART UPJOHN AND LORIMER RICH, both of New York, caught in the clipped yew of the Palace Gardens.

F. A. E. C. T. CONVENES IN ROCHESTER

"For a group of men who have mastered the application of science to industry," said National Secretary Jules Korchien, "we have been neglectful of applying that approach to our own problems." Federation Architects, Engineers, Chemists and Technicians' Second National Convention in Rochester, April 17-19, took that statement to heart. For three days the delegates plodded through a long, complex and important agenda in which every phase of their social and economic problems was discussed. Notable from the first for its frankly trade union approach and for the recognition of the employee status of its members, the convention moved through a steady progression of decisions to the final one of affiliating with the American Federation of Labor.

National Secretary Korchien, reporting on the past year's work, said "Our experience in the Federation has taught us that no matter what part of our program we develop, it must fit into the pattern of our national life. It must benefit not only ourselves but society as a whole; our program is sound because it does just that." The convention followed the procedure of hearing and discussing reports on all the major points on the agenda. Action later took the form of resolutions based upon these reports, and these resolutions form the directives for the Federation's coming year.

Convention work was lightened by a ball on the opening night and by several open meetings at which various speakers were guests. Mayor Charles M. Stanton, of Rochester, formally opened the convention hoping "that it would progress towards its goal," and calling attention to the fact that Rochester parks boasted some 250 varieties of lilacs. Francis Bonn, president of the Rochester Newspaper Guild, spoke at one session on the similarity of the problems facing all white collar workers, and the necessity for unity of action between them. Dr. James D. McGill, president of the Rochester Board of Education, spoke on "Liberty and the Constitution." Said Dr. McGill: "Abstract liberty is not to be found. Political freedom nowhere exists without economic liberty." The Hon. Julius Hoesterey, City Councilman of Rochester, at the same session denounced the confusion now existing between education and intelligence.

Excerpts from some of the important resolutions of the convention follow.

AFFILIATION WITH A. F. of L.

"**Whereas** only a small fraction of the technical employees of the country are organized in associations for their economic betterment, and **Whereas** the exigencies of the present situation in our country make it imperative that their unified collective strength be hastened to improve and protect their economic condition, **Resolved** that the Convention approve affiliation with the International Federation of Technical Engineers, Architects and Draftsmen."

PRIVATE INDUSTRY

"**Whereas** the technical professional workers are confronted with curtailment of WPA and public works in general, and **Whereas** independent private architects and consulting engineers are rapidly disappearing and finding it increasingly difficult to pay a wage commensurate with the training, abilities and requirements of their employees, and **Whereas** large chain stores, mail order concerns, corporations and utilities are doing a greater and greater percentage of their planning architectural and engineering work, **Resolved** that in general the Federation's aim is a 100% union-made product—whether it be a building, a machine, or a chemical product—from the inception of the idea and the design to the finished product and, further, that we favor the 30-hour week."

MARCANTONIO WORKS STANDARD BILL

"**Whereas** there exists a persistent drive to eliminate or reduce the WPA program, and the need for jobs and relief still exists (a recent A. F. of L. census shows 12,600,000 still unemployed), and **Whereas** the Marcantonio Bill is designed to meet the needs of the present situation until genuine unemployment insurance is established, **Resolved** that this Convention indorse and support the Marcantonio Federal Relief and Works Projects Standards Bill, HR. 11, 186."

SOCIAL SECURITY

"**Whereas** technical workers self-employed and employees continue to suffer from continuous or periodic unemployment, **Resolved** that the Federation work for the liberalizing of the present Social Security Act along the lines suggested by the Frazier-Lundeen Bill."

NATIONAL YOUTH ACT

"**Whereas** the attention to our youth is a prime responsibility of the nation for its future well-being and **Whereas** youth today finds it difficult to continue its training for its place in society, and even after school finds no employment, and **Whereas** those finding employment in our professions today do so at greatly reduced wages, thus threatening the standards of the entire professions, **Resolved** that the Federation indorse and actively support the National Youth Act."

LICENSING

"**Whereas** there is a decided tendency towards limiting the number of future licensed professionals as a solution to the present limited opportunities for licensees, and the institution of an apprentice system harking back to an outgrown medieval guild system, **Resolved** that every chapter study the professional licensing provisions within its state and those chapters faced with the immediate problem of licensing

(Turn to page 420)



MAYOR CHAS. M. STANTON

"Rochester has 250 varieties of lilacs"



HUGH B. JOHNSON

The Rochester Chapter was host



FRANCIS BONN

The Newspaper Guild wants unity



President Robert Sentman and Elizabeth Bradford, of Chicago, caught with Jack Spinner, editor FAECT's "Bulletin"



Discussing the photos (left to right): Frank Kornacker, Chicago; Ray Weber, New York; Elizabeth Bradford, National Secretary; Jules Korchien, New York; Hugh B. Johnson

NEWS OF THE MONTH



© House and Garden

Complete to the pansies in the garden.



Photo by H. H. Costain

The principals pose.

FOR THE HYPOTHETICAL FAMILY IN BETTER CIRCUMSTANCES

To the clink of cocktail glasses and the scraping of liveried manservants, *House and Garden* opened its "essentially public-spirited undertaking," Ideal House. Special cars took guests to Scarsdale, N. Y., where FHA's Stewart McDonald presided at the preview. Left to right: Conde Nast, publisher of House and Garden; Verna Cook Salomonsky, architect of Ideal House; Stewart McDonald, FHA; Margaret Dorgan, decorator; Richardson Wright, editor.

A BEAUTY CONTEST FOR BRIDGES

A jury of nationally known engineers and architects has been appointed by the American Institute of Steel Construction, Inc., to select the most beautiful bridges of steel built during the past year. The awards will be made at a meeting of the jury to be held in June and the bridges chosen will later be decorated with a stainless steel plaque. This will be the eighth consecutive year that such awards have been made.

There will be three prize winners, selected from bridges of three different groups.

17 OUT OF 100,000 HAVE 'EM

March was the nation's best home-building month since 1931, according to FHLBB. However, the rate of small dwelling construction lagged shockingly behind demand, the average number of dwellings constructed per 100,000 being only 17.

AUTO MEN EYE HOUSING

An exploration into industry to search out jobs for the unemployed led President Roosevelt into a series of conferences which may prove profoundly significant for the building industry. In a talk with Walter P. Chrysler, motor car magnate, he asked Mr. Chrysler "how much it would cost to produce a cheap automobile, one costing about $600 under mass-production methods, if the car were built piece by piece in a machine shop. He said that Mr. Chrysler estimated the cost at about $3,500. Mr. Roosevelt then pointed out that all house construction is still done by the machine-shop method, and home owners go without the benefit of the economies of mass production."

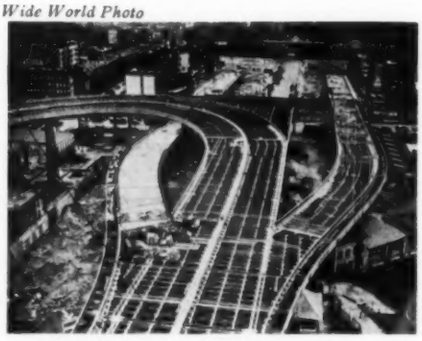
The President is convinced that between 500,000 and 1,000,000 small homes could be sold immediately if the quantity-production methods of automobile factories could be employed to turn out such dwellings at a cost not exceeding $2,500. The Chrysler conference is one of a series with industrial leaders, for whose products there is a potential demand "if prices and purchasing power can be brought into proper relation to one another." No solution for this problem has been found, but Mr. Roosevelt "indicated a strong determination to pursue studies already begun."

OFF TO AN EVEN START

America's rival "World Fairs of 1939" moved towards actuality this month. Creation of the made land on which the San Francisco Exposition will be held has begun with U. S. Army dredges, while work on the Golden Gate and Oakland Bridges proceeds ahead of schedule. By a unanimous vote, U. S. Senate passed a bill authorizing President Roosevelt to invite participation of all foreign nations in the Fair. This, it is pointed out, "means that the San Francsco Bay Exposition is the only 1939 Fair to be given official governmental sanction and approval."

However, with the City of New York authorizing the expenditure of $7,000,000 on improvement of the Flushing Meadows site, the New York World's Fair of 1939 appeared ready to enter the construction phase. This appropriation is contingent upon a $4,000,000 grant from the state. The board of the Fair corporation, expanded recently to include city, state and Federal representatives, plans to float a $20,000,000 bond issue.

Wide World Photo



PLANNING TO ELIMINATE TRAFFIC SNARLS

Approaches to modern bridges are no longer simple affairs, as is indicated by this view of the Manhattan end of the new Tri-Borough Bridge in New York. The approach veering off to the left connects with the new East Side Highway, a link in the high-speed motor road which will eventually girdle the Island.

PUBLIC WORKS PIERS FOR PUBLIC WORKS SHIPS

Like the Pyramids and the Parthenon, the "Queen Mary" is a public works project; and when she docks in New York this month, she will tie up to another public works project—the new PWA Pier No. 90 in the North River. The new pier, together with its twin No. 88 (for the "Normandie," likewise something of a works project), will constitute "the most modern ship terminal facilities in the world." Of fireproof construction, the piers will contain heated passenger quarters, rest rooms, elevators and escalators and even incinerators for garbage which heretofore accumulated on shipboard and which cannot be dumped in the harbor.



Wide World Photo

RA'S "RED" PROJECT AT RED HOUSE, W. VA.

Widely denounced as "communistic" because of its cooperative factories is this subsistence farms project in a quiet West Virginia valley. A community of 150 new homes, complete and occupied, Red House Farms still lacks one essential—reliable sources of employment.

Wide World Photo



F. D. R. WITH HISTORIC TROWEL

Although cornerstones have long ceased to have any structural function, their political value was exploited recently in Washington when President Roosevelt laid the cornerstone of the new Interior Building. He is seen here using the same trowel that George Washington used on the Capitol cornerstone in 1793. Although separated by a century and a half, the buildings are of much the same architectural style.

ENGLISH ARCHITECTS ESTABLISH SCHOOL FOR POLITICO-PLANNERS

Against the day when national planning will be a fact and not a dream, a new School of National Planning has recently been opened in London under the auspices of the Architects' Association. F. E. Towndrow, writing in *Architectural Design and Construction*, explains that the school is a post-graduate one intended "to produce a type of planner who is not only equipped in respect of statutory town-planning, but one who will be able to deal with wider issues in social and economic life."

The course takes two years and includes "the study of such related subjects as economics, social science, public administration, local government, and law, in so far as they generally affect planning. Of course, it would be impossible in such a short time to study, with any thoroughness, all these related subjects, for they would comprise almost the whole of human knowledge. Yet in the future they must form an essential part of the *general education* of the planner, the administrator, and politician.

"Logically, in order to plan a new street one ought to plan the whole city, in order to plan the city one must plan the region, and then not only the region, but the whole country. And apart from these factors there are the more diffused, yet more intimate, factors of an unplanned legal system—the laws of land and property, and unbalanced financial and economic system, a state of poverty in the midst of plenty, a mental condition of medieval ignorance and prejudice."

"DISCREET PALETTE" FOR CLEVELAND FAIR

Otto Teegen and Irvin L. Scott, New York architects and associates of the late Joseph Urban, are developing the color scheme for the Great Lakes Exposition, which opens in Cleveland June 27. Both men were engaged with Mr. Urban in a similar capacity for Chicago's Century of Progress.

"While considerable experimentation has been engaged in, the color scheme for the Great Lakes Exposition has not yet been established," said Mr. Teegen. "I can say, however, that regardless of the general similarity of purpose governing the plans, the color scheme of this Exposition will distinctly differ from that employed at the Chicago Fair and a more limited palette will govern. There we had to contend with a tremendous array of heterogeneous structures without relation to each other in plan or mass and the only thing they possessed in common was the color, the common denominator. A palette of ten or twelve colors will suffice for the Great Lakes Exposition because of its more orderly arrangement. There will be a single basic tone, white, with colors used for supplementary purposes in small areas rather than on a huge scale, as at Chicago.

"Three years have elapsed since Chicago's great effort and we contend with entirely new conditions, and pleasing the current era is our objective. Materials used for such structures no longer possess decorative features in themselves, so interest must be supplied to these large flat surfaces through a discreet employment of colors used in pleasing combinations, and in the right places."

CARPENTERS HAMMER, COURT ADJOURNS

As scaffolding around the New York Criminal Courts Building rose higher and higher, the noise from the hammering forced Judge C. F. Collins to order the workmen "to cease and desist." The District Attorney, relaying the Court's message from a window above the workmen, met with a bedlam of increased hammering.

The jurors yelled: "We can't hear a word (of the testimony)." The Judge said: "Either those carpenters will have to stop their hammering or we'll have to stop this trial." The carpenters replied: "We've got a time limit on this job and can't stop."

Court was adjourned until such a time as the rising scaffold carried the workmen out of hearing.

Acme Newspictures Photo



BUT THIS POOR LANDLORD GOT NONE

When Oscar Oschatz, Chicago landlord, went to this building to collect his rent, he found the tenants evicted and the building half demolished. The wreckers, halted by court order, showed a wrecking permit giving this address. Oschatz, who hasn't yet found who made the mistake, insists somebody will pay for it.



Wide World Photo

PARIS CLEARS GROUND FOR 1937 EXPOSITION

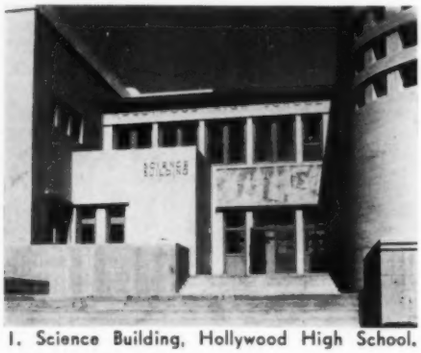
Workmen have completed demolition of the old Trocadero, which will be replaced by a group of new permanent buildings for the Exposition. Seen in the middle distance is the base of the Eiffel Tower.



DEMONSTRATING THE USES OF ENAMEL is this new structure now being constructed at Cleveland's Great Lakes Exposition.

NEWS OF THE MONTH

IT TOOK AN EARTHQUAKE TO START THIS SCHOOL-BUILDING PROGRAM



1. Science Building, Hollywood High School.



2. Manual Arts High School, Los Angeles.



3. Hamilton Junior High School, Los Angeles.

Three of the schools in the $40,000,000 California-PWA program to rebuild the state's educational plants. Legislation passed as a result of the last earthquake makes tremor-resisting structures mandatory.

U. S. COMMISSIONER OF EDUCATION ATTACKS FASCISM IN AMERICAN SCHOOLS

"Let those who want to protect the people from what is considered a dangerous doctrine, advocate such control not in the name of democracy but as part and parcel of a fascist program," declares John W. Studebaker, U. S. Commissioner of Education in his new book, *Plain Talk*. In discussing freedom of thought and instruction for the American schools (academic freedom), Dr. Studebaker writes: "Freedom of speech, of press, of assembly, and of teaching, go hand in hand. These freedoms are not primarily for the protection of the individual rights of speakers, or publishers, or organizers of meetings, or of teachers. They are fundamental to democracy because they protect the masses of people in their essential right to hear, to read, to assemble and discuss, and to learn. Once any one of these freedoms is successfully suppressed, we are in danger of losing all of them."

Dr. Studebaker, who is regarded as the outstanding American advocate of public forums, is the father of the nationally-known Des Moines forums, and director of a Federal Government educational project which has set up 10 demonstration public forum centers throughout the United States (see page 430). Dr. Studebaker insists that people must be taught "not what to think but how to think through public issues; not what is true, but what alternatives there are to choose from; not what to believe, but how to get understanding."

COURT FINDS RA "SATELLITE TOWN" ILLEGAL

Rexford Guy Tugwell, Resettlement Administration Head, was specifically enjoined from proceeding with the Bound Brook satellite town now under construction in Franklin Township, N. J., by a recent decision of the Federal Court of Appeals in Washington. The decision was the result of a suit brought against RA by property-owning individuals in Franklin Township, who maintained that the new project would result in a loss of valuable taxable property and would become a financial burden because the township would have to furnish utilities. Their suit further questioned the legality of the entire Federal Emergency Appropriations Act of 1935, under which RA is set up.

According to administration spokesmen, construction work on the other satellite towns (which are not directly affected by the decision) will be rushed to completion by fall. "By that time almost all current work relief funds will have been spent, in addition to a large part of the new appropriation, and the Supreme Court will be faced with a fait accompli, as in the case of gold devaluation."

PWA AND THE NATION'S SCHOOLS

School construction has been one of the major accomplishments of the public works program, according to a recent report by Administrator Ickes. Thirty thousand classrooms providing accommodations for over 1,000,000 students have been added to the nation's school system in more than 4,000 buildings. At a cost of $120 per student, the PWA has been responsible for at least 75% of the school construction during the last 2½ years, Mr. Ickes reported.

Elementary Schools	
New classrooms	13,825
Number of students	550,729
High Schools	
New classrooms	10,948
Number of students	435,803
Combination Elementary and High Schools	
New classrooms	4,863
Number of students	195,198

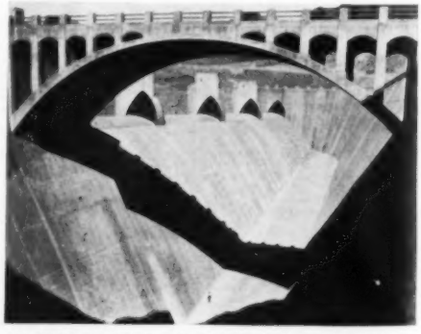
In addition to loans and grants made directly to public bodies for school construction, PWA allotted $30,000,000 to schools under the supervision of the Federal government, such as Indian schools, the Naval Academy at Annapolis, and the Military Academy at West Point.

Wide World Photo



LIGHT WEIGHT ON THE "HINDENBURG"

Limitations of size and weight in the furnishings of the new German airship have resulted in excellent modern design, as in the dining room above. Although the "Hindenburg," which made its initial trip to New York last month, was designed and financed before the Hitler régime, the Nazi swastika was prominently displayed on its hind-quarters.



Wide World Photo

AMERICA'S LARGEST BATTLESHIP COULD BERTH HERE

One of the two spillways of the recently completed Boulder Dam. These great channels protect the dam against sudden rises in the Colorado; together they can by-pass 400,000 second feet of water.

STUDENT BRIDGE DESIGNS JUDGED

Clarence H. Rosa, University of Michigan student, won first prize in the eighth annual bridge design competition held by the American Institute of Steel Construction. A. W. Millington, a student of Rensselaer Polytechnic Institute, won second prize. First honorable mention went to Russell E. Madsen of Rensselaer Polytechnic Institute and second and third honorable mentions, respectively, to John A. Grove and Frank R. Streba of Carnegie Institute of Technology.

The problem was to design a steel highway bridge having a span of 300 feet, with 30 feet minimum vertical clearance over a river. In addition to giving the students certificates of award, the first prize carries a cash compensation of $100 and the second prize $50.

PRIX DE ROME AWARDS IN ARCHITECTURE, LANDSCAPE ARCHITECTURE

A twenty-five year old Georgian, Richard Ayers, is winner of the Prix de Rome in architecture, the American Academy in Rome announces. Robert Kitchen, twenty-three, of Dayton, Ohio, is winner of the landscape award. Kitchen is the ninth winner from Cornell in the fifteen years the landscape prize has been awarded.



EUGENE F. STOYKE

ILLINOIS STUDENT BAGS PLYM AWARD

Eugene F. Stoyke, graduate student at Illinois' School of Architecture, is the winner of the 23rd Francis J. Plym fellowship. The award, which entitles the winner to a year's study of architecture in Europe, is only open to American citizens who are graduates of the School of Architecture. Mr. Stoyke, whose winning problem was *A Stop-over on a Transcontinental Highway*, was born in Germany in 1912 and came to this country in 1923. He studied architecture at Armour Institute and the University of Illinois, where he received his Bachelor's degree in 1935.



M. I. T. STUDENTS BUILD HOUSE FOR SALE

Under a new plan at Massachusetts Institute of Technology, undergraduate students of the School of Architecture will now be able to combine theory and practice, according to Professor William Emerson. A revolving fund has been established whereby a house—designed, located and supervised by the students—will later be marketed and the proceeds put into another and similar project. The prize-winning design for the year is shown above with its student architects, Samuel Scott, freshman, of Weymouth, Mass., and Thomas Akin, sophomore, New Bedford, Mass.

PROGRESSIVE PLANNING RECOGNIZED AT COLUMBIA

Winner over seven competitors, James S. Atkins of New York has been awarded the F. Augustus Schermerhorn traveling fellowship of Columbia's School of Architecture for 1936. The fellowship, open to graduates of the School within the past ten years, carries a stipend of $1,700 for study abroad.

The Schermerhorn competition called for designs of a progressive country day school "especially adapted to the new education, which is based on complete time-freedom for the children."

Atkins's design, according to the jury, excelled in its provisions for air and light and in its ingenious arrangement of outdoor classrooms. "The classrooms form wings on either side of a long corridor. Each classroom opens out into an individual garden space between wings, which may be used for outside study. Two large art studios, a science laboratory, and offices for twelve teachers are provided for. The gymnasium and auditorium compose a separate unit, which may be closed off. A manual training and crafts room adjoins. Kitchen, lunchroom, cafeteria, and dining terrace connect the auditorium and classrooms, while a kindergarten and nursery school with covered playgrounds are in still another division. The school is planned for 250 children of both sexes."

THE SUNNY SOUTH: BEFORE AND AFTER



1. Can those who lived here . . .

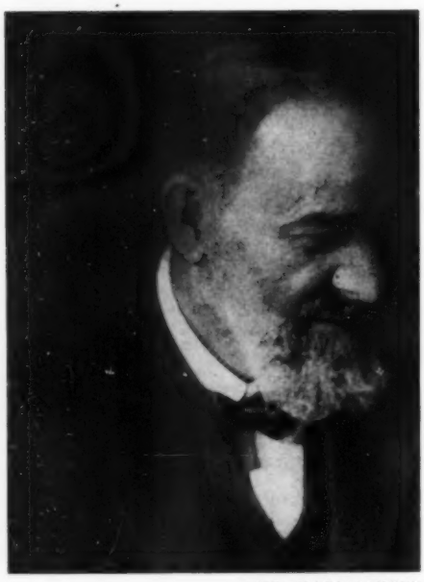


2. . . . afford this?

Wide World Photo

Two views of the PWA slum clearance project for Negroes in Atlanta, with Atlanta University in the background. The new housing project, which will be ready for occupancy this year, provides 675 modern living units, at prices considerably higher than those paid by the former tenants.

Wide World Photo



Hubacher, Zurich, Photo. from "Das Werk"

DR. KARL MOSER

Dr. Karl Moser, famous Swiss architect and one of the founders of the modern school of architectural design, died February 23 at the age of 75 in Zurich, Switzerland. Although born in 1860 and himself a product of the academic Ecole des Beaux-Arts in Paris, Dr. Moser displayed throughout a long life a constant alertness to new developments in architecture. Himself a successful architect in Zurich and southern Germany, where he did many notable buildings, he distinguished himself even more as a teacher. "He could, as one of the few of his generation, place himself without effort in the philosophy of modern architecture and actively promote these new trends."

After an extensive education in Zurich, Paris and Wiesbaden, with later studies in Italy, he became junior member of the firm of Curjel and Moser in Karlsruhe. This firm did the famous Zurich Kunsthaus, as well as many churches in Basel, Bern and Zurich. Returning to Zurich in later years, Dr. Moser was architect for the addition to the Kunsthaus, Church of St. Anthony, Basel (*Architectural Record*, May 1929), and many other buildings. His activity and influence in architecture continued until his death.

A.I.A. CONVENES (from page 414)

gram" but demanded that control of all public housing agencies be decentralized. It recommended the acceptance of the principle "that the (housing) demands of those having ability to pay an economic rent be met by private enterprise, but that need caused by inability to pay be relieved by public aid." To this end, it suggested a dual standard of planning. "No effort can be broadly successful," it felt, "unless directed towards the greatest bulk of home building, the low-priced small house."

FOR STUDENTS: APPRENTICESHIP

Student delegates from twenty-six schools of architecture heard Dean William Emerson of M.I.T. read a significant Report in which he outlined an apprenticeship system consisting of "a sound background of education in a school of architecture or a careful training in an office, in each case supplemented by a supervised period of three years experience in the practical essentials of architectural practice."

IS GOVERNMENT IN THE ARCHITECTURAL BUSINESS?

Francis P. Sullivan, Committee on Public Works, made a Report on the work of his Committee. A definite basis for advancing the standards of planning, design and construction of public buildings has been laid in a series of conferences with the Secretary of the Treasury, according to the Report. One of the questions involved is whether permanent governmental architectural agencies are necessary and, if so, what their organization and functions should be. The method of selection of private architects, where they are engaged in government work, as well as of materials, are questions before the conference. What, if any, obstacles to architectural advance are raised by unnecessary governmental restrictions also are the objects of study.

F.A.E.C.T. CONVENES (from page 415)

loss inimical to the welfare of the technical employee, take the necessary steps to effect those changes it finds necessary in dealing with the proposed creation of an apprenticeship system."

FLOOD CONTROL

"**Whereas** floods in the U. S. have become a national menace, and **Whereas** it is possible to control such floods on a national scale, **be it Resolved** that all existing agencies of the Federal government dealing with phases of our water resources be consolidated, and empowered to plan and act accordingly to its own recommendations. That such a plan be national in scope so that resulting social and economic benefits may be integrated for the population as a whole.

HOUSING

"**Whereas** technical workers share with all other workers the evils of inadequate high rental and high-cost housing, and the problems thereby created have not yet been solved by private enterprise or the government, **Resolved** that the F.A.E.C.T. support housing legislation based upon the following principles of an adequate housing program. (1) A Federal housing fund to be created out of the Treasury of the United States of sufficient size to provide for the building of at least one million dwelling units per year over a ten-year period. (2) The availability of this fund to state and municipalities in the form of grants for the construction of high-standard housing, providing that these states and municipalities conform to certain standards established in this legislation. These standards are: A—A fixed maximum rental which shall insure that the housing shall be available to the low-income groups. This rental shall be not more than $5 per room per month depending upon average earnings in the localities of the low-income groups for whom this housing is intended. B—The payment of the union rate of wage, or in the absence thereof, of not less than the prevailing rate for all employees in any way engaged in the housing projects. Wherever possible, such employees shall be selected from civil service lists and the civil service scale shall be paid. The right of collective bargaining for all such employees. C—Democratic representation of workers and tenant groups in the initiation, management, and control of the housing project and in the direction of the social activities of the tenants."

CIVIL LIBERTIES

"**Whereas** the interests of every technical worker are directly affected by increasing attacks upon freedom of speech, upon the right to organize, and the right to assembly, by such oppressive measures as compulsory oaths, fingerprinting and the like, and legislation before the Congress such as the Kramer Anti-Sedition Bill, the Tydings-McCormack Military Disaffection Bill, the Dies Bill and the Dunkel-Baldwin Bill, **Resolved** that the Federation condemn all such measures designed to curtail the civil liberties of the people."

CALENDAR OF EXHIBITIONS AND EVENTS

- **June 6**—Opening, Texas Centennial Central Exposition at Dallas, Texas.
- **June 13**—Graduate Scholarship Competition, School of Architecture and Allied Arts, New York University, New York City.
- **June 15-19**—Semi-annual meeting, American Society of Mechanical Engineers, Dallas, Texas.
- **June 22**—Opening, Booth Travelling Fellowship Competition, College of Architecture, University of Michigan, Ann Arbor.
- **June 27**—Opening, Great Lakes Exposition, Cleveland, Ohio.
- **June 29**—Opening, Summer School, College of Architecture, University of Michigan, Ann Arbor.
- **July 6**—Opening, Summer School, Department of Architecture, Syracuse University, Syracuse, N. Y.

CONTRIBUTORS TO THIS ISSUE



WILLIAM G. CARR . . . . New Demands in School Housing

Ph.D., Stanford University, 1929. Director of research, National Education Association, since 1931. Also secretary, Educational Policies Commission. Visiting professor of education at Stanford University (1929, 1931), University of Michigan (1930, 1933, 1934), University of California (1935). Author of numerous books on education, including "School Finance," "Essentials of Taxation" (in collaboration with Harley L. Lutz), "Schools in the Story of Culture" (with Charles A. Beard).



LESTER DIX . . . . . Housing America's New Education

Assistant professor and associate director of Lincoln School, the experimental school of Teachers College, Columbia University. Work has been largely in the field of administration, with particular interest in economics and in the arts. Author of "The Economic Basis for the Teacher's Wage" and "The Educational Personnel of the Chicago Schools," a section of the Chicago School Survey; and a number of articles on various issues in education for professional and general periodicals.



JAMES E. MENDENHALL . Housing America's New Education

Ph.D., Teachers College, Columbia University, 1930. Member of the research staff at the Lincoln School since 1928. At present editor of "Building America," a photographic magazine of modern problems for young people in junior and senior high schools, published by Society for Curriculum Study, Inc., 425 West 123rd Street, New York. Recent issues of this publication have covered such subjects as housing, men and machines, transportation, communication, power.



EARL F. SYKES . . A Modern Bibliography of School Design

M.A., School of Education, University of Montana, 1931. Awarded Teachers College Scholarship, 1935, and Teachers College Fellowship, 1936. Member of Phi Delta Kappa and Kappa Delta Pi, national honorary educational fraternities. Served 8 years as superintendent of schools in Montana. His bibliography in this issue represents original work and covers, in a highly selective manner, the field of recent publications on school design.



F. L. DEVEREUX . . . . . Better Acoustics for the School

Vice-president, Erpi Picture Consultants, Inc. Author of "The Educational Talking Picture" and recognized as the originator of the educational talking picture. Organized a group of educational research experts and motion picture production experts which has been engaged for more than 7 years in the development of standards for the production of educational talking pictures; a large number of educational talking pictures have been produced, notably the Physical Science series.



ALSTON RODGERS . . . . . Better Light for the Classroom

M.E., Stevens Institute of Technology, 1925. At present lighting engineer, General Electric Company, Incandescent Lamp Department, Nela Park, Cleveland. Co-author with A. L. Powell of "Lighting the Non-Professional Stage Production" and "Engineering Features of Built-in Lighting." Also well-known as a lecturer and consultant on various phases of lighting, particularly schools, theaters, stores, offices, expositions and industrial safety.

STRIKING IMPROVEMENT OCCURS IN EDUCATIONAL BUILDING

Further Gains Likely

By L. SETH SCHNITMAN, Chief Statistician

F. W. Dodge Corporation

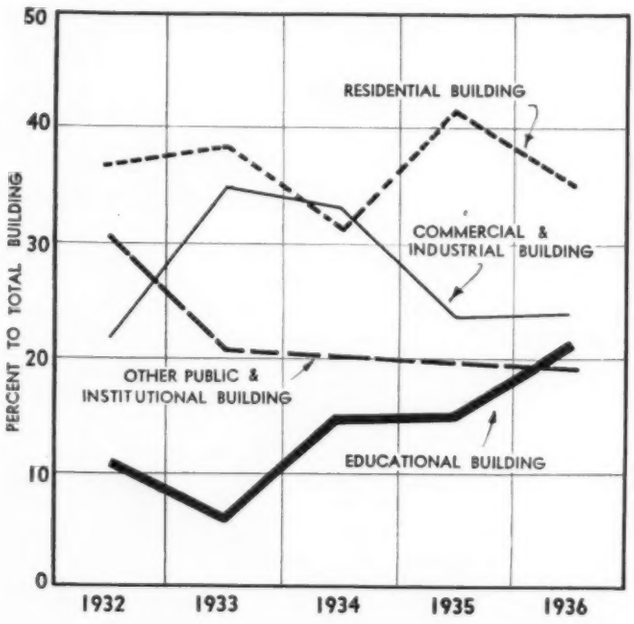


CHART 1: In 1936, educational building has displaced all other public and institutional buildings in relative importance.

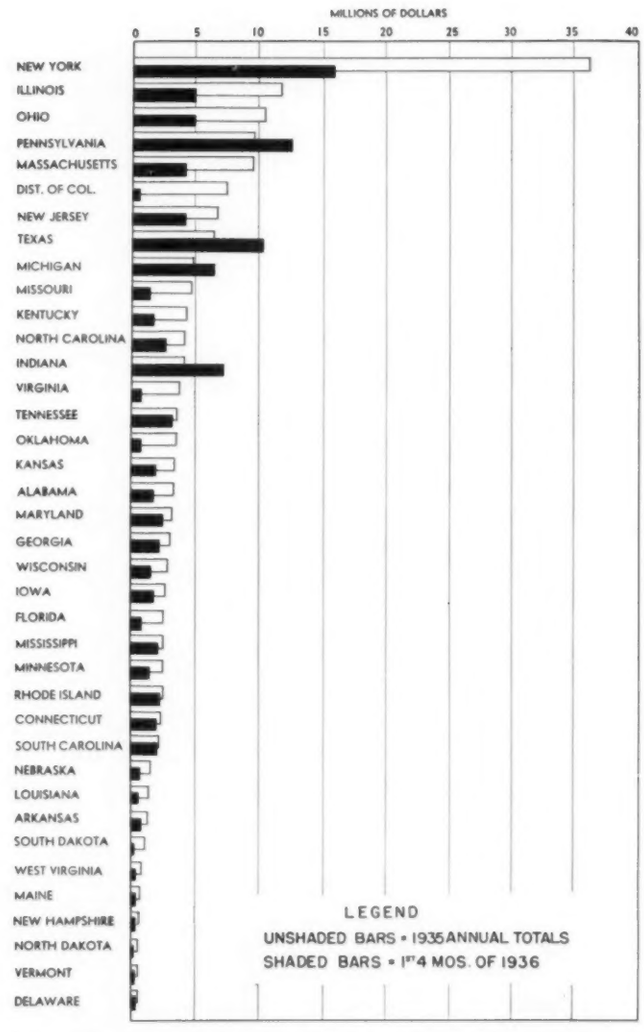


CHART 2: Four-month totals for educational building in 1936 already exceed full year 1935 totals in Pennsylvania, Texas, Michigan, and Indiana. Many other states will share this distinction within the next two or three months.

In recent months, educational building projects have taken on an enlarged significance. More important still, this favorable condition appears destined to be maintained during the next few months. As a result, the year 1936 should end with a construction total larger than for any other year since 1930 when some $333 million were expended for this specialized class of building in the area east of the Rocky Mountains.

During 1933 educational building accounted for only 6 per cent of all building operations undertaken in the 37 eastern states. Heavy engineering projects have been excluded in this consideration. Since 1933 the relative importance of educational building construction has advanced progressively so that for 1936, to date, such construction has not only accounted for virtually 22 per cent of all building, but is even more important, relatively, than all other classes of public and institutional building combined.

For the 37 eastern states the 1935 total for educational buildings of all descriptions amounted to $173 million, itself a larger annual total than for any year since 1931 when a total of $229 million was shown for the 37 states. New York, Illinois, Ohio, Pennsylvania and Massachusetts, in their order of rank, accounted for a combined total of $78 million or 45 per cent of all educational construction projects undertaken last year in the area east of the Rocky Mountains. Chart 2 shows the 1935 ranking of each of the states and the District of Columbia, together with comparisons covering the value of educational projects which have been started during the initial four months of 1936.

It is of interest to note from this chart: (1) that thus far this year, Pennsylvania ranks second only to New York, whereas for 1935 Pennsylvania was fourth; (2) that Texas in the initial four months of 1936 stood third against eighth in 1935; (3) that for

the states of Pennsylvania, Texas, Michigan and Indiana the four-month contract totals for 1936 for educational buildings have already exceeded the state totals for the full year 1935; (4) that for virtually all other states, the totals for 1936 as a whole will exceed their respective figures for 1935, if the results for the first four months of the current year are any criterion.

A relatively large number of educational building projects—schools, colleges, gymnasium buildings, libraries, laboratories—is out for bids. A considerable number of projects is still in early contemplated stages. These factors presage continued gains in contracts as compared with 1935.

Last year publicly-financed projects accounted for 80 per cent of the total dollar volume of educational building. It is probable that substantially the same proportion will hold for 1936. With the funds of PWA and WPA all allocated and a large percentage of these already expended or committed and no indications of any appreciable additions specifically earmarked for building purposes to come from the appropriations of the current Congress, educational building prospects over the longer range appear somewhat clouded.

But an improving market for municipal bonds and further indicated gains in business generally, resulting in better tax revenues, should operate to sustain the flow of funds into educational buildings for some time to come having due regard for the social demand for such facilities.

The architect's influence in planning educational projects amounted to 93 per cent of a possible 100 per cent, i.e., 93 per cent of the value of all educational projects undertaken in 1935 was planned by architects. This proportion will probably be at least as high for 1936 as a whole.

Of the value of all educational building started in 1935, 65 per cent was for new facilities as distinguished from alterations and modernizations. For the initial four months of 1936 new work accounted for 80 per cent of the total volume of educational buildings. This latter percentage is more likely to be the pattern for 1936 as a whole than the lower ratio of 1935.

Each of the 13 major geographic districts in the area east of the Rocky Mountains has shown a larger volume of educational building operations during the first four months of this year than for any other comparable period since at least 1931. These results are shown on Chart 3, covering the years beginning with 1933. For most of the important districts the 1936 recovery in educational building, by any recent standards, has been almost spectacular. That the current rate of gain can be maintained is to be doubted but continued quantitative increases seem assured.

Altogether a review of current activity in the field of educational building and of the forces that motivated the large improvement of recent months brings the conclusion that the outlook for this field of building is reassuring.

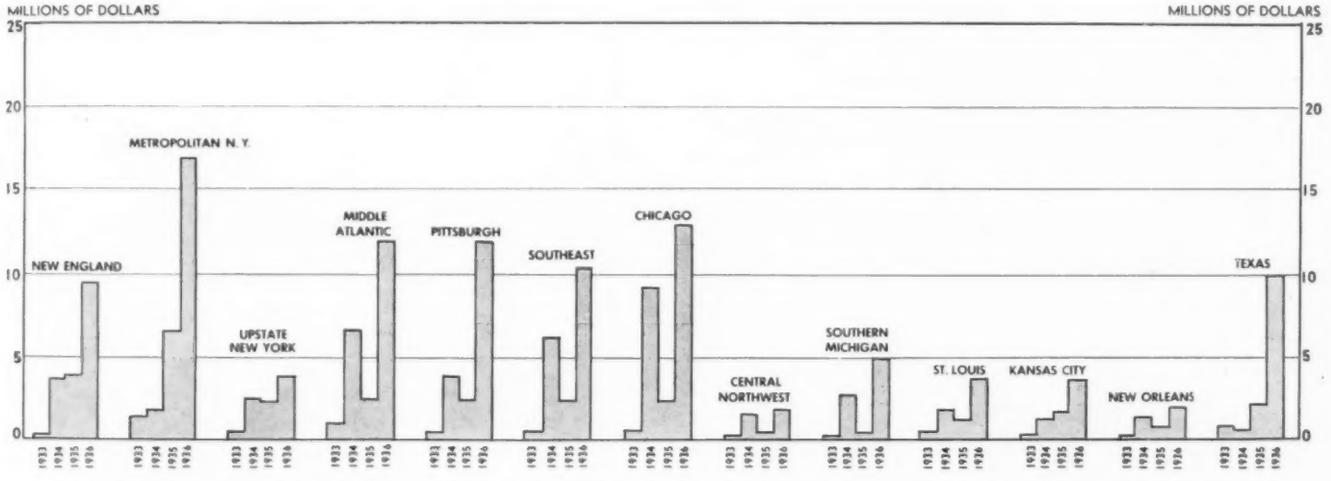


CHART 3: Each district in the entire area east of the Rocky Mountains reported a larger amount of educational building started during the first four months of 1936 than in any other comparable four-month period of recent years

VALUATION OF EDUCATIONAL BUILDING CONTRACTS IN 37 EASTERN STATES DURING FIRST FOUR MONTHS OF EACH YEAR OF THE YEARS 1931-1936

Arranged by major geographic districts.

TERRITORY	*1936*	*1935*	*1934*	*1933*	*1932*	*1931*
New England	$ 9,057,300	$ 3,879,700	$ 3,628,100	$ 213,800	$ 4,833,900	$ 9,466,300
Metropolitan New York	15,746,800	6,556,800	1,922,800	1,612,200	3,157,200	12,831,700
Upstate New York	4,792,800	2,375,800	2,443,400	407,400	1,930,600	4,710,500
Middle Atlantic	12,363,900	2,354,900	6,598,100	903,000	10,484,800	9,708,400
Pittsburgh	12,252,900	2,343,900	3,795,300	372,000	1,724,000	14,203,800
Southeastern	9,470,700	2,218,800	6,117,300	443,400	832,400	2,288,000
Chicago	12,863,000	2,265,200	9,195,700	363,200	4,129,400	8,899,300
Central Northwestern	2,045,200	281,700	1,536,800	118,400	1,362,200	2,557,400
Southern Michigan	5,002,800	258,900	2,576,400	15,000	653,200	8,551,400
St. Louis	3,823,000	1,125,600	1,714,700	410,900	763,000	4,688,500
Kansas City	3,722,700	1,613,600	1,058,400	247,900	238,900	1,928,400
New Orleans	2,135,900	744,000	1,240,300	67,000	503,900	1,748,900
Texas	9,679,800	2,177,400	560,000	807,100	5,014,600	1,875,100
37 Eastern States	$102,956,800	$28,196,300	$42,387,300	$5,974,300	$35,628,100	$83,437,700



SCHOOL-HOME FOR CHILDREN AT BALBUENA, MEXICO CITY GARCIA AND DE LA MORA, ARCHITECTS — PHOTOGRAPH BY HELLEN FISHER

SCHOOLS

"To provide better schoolhouses for our 2,7000,000 city children and our 5,000,000 rural children would require, at $400 each, about $3,000,000,000."

NEW DEMANDS IN SCHOOL HOUSING

By WILLIAM G. CARR

Director of Research and
Secretary, Educational Policies Commission
National Education Association

There are many signs suggesting that, given even moderately steady and prosperous economic conditions, the nation stands at the threshold of an extensive school building program. The situation is in some respects similar to that immediately preceding the school building activities of the period between 1924 and 1928. An accumulated shortage in school facilities, the improvement of business conditions, and a continually growing enrollment are factors which are common to both periods. However, the present situation differs from that of a decade ago in at least three important respects. First, there is now a rather general depletion of local tax resources and especially of local credit for financing new public buildings. Second, there is today considerable uncertainty as to the type of general economic organization which may be developed in the next few years. Finally, the problem ten years ago was acute in elementary and secondary schools; today, the effects of the previously declining birthrate are easing the pressure on the elementary schools, while the high schools and colleges present the areas of most acute need.

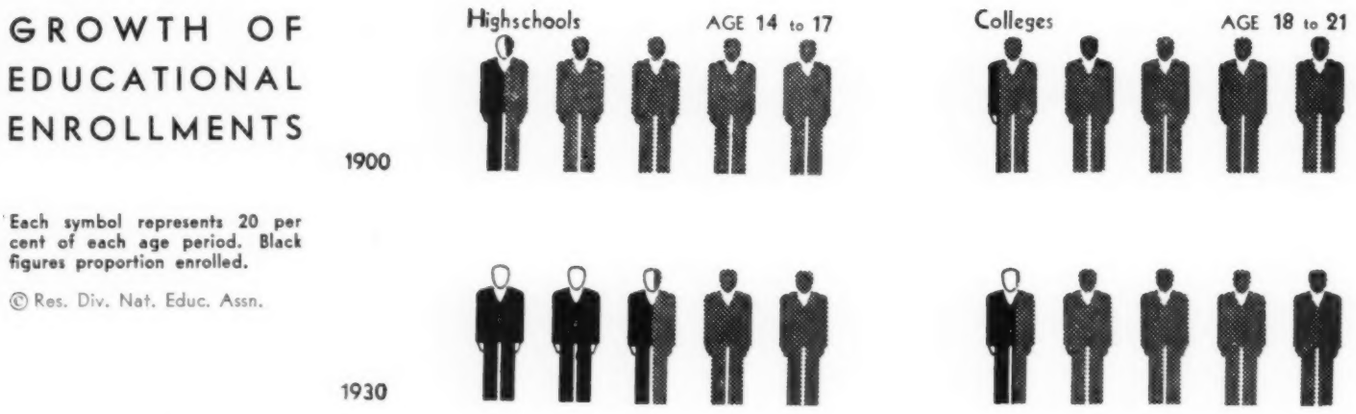
Pre-depression school building shortage

Contrary to some popular opinions, the schools were not in 1930 well prepared for the severe financial difficulties which were destined to afflict them. The reason for this unsatisfactory condition is to be found in the fact that the nation, as a whole, had not caught up with the building shortage which accumulated during and immediately after the war. Conditions of course differed greatly from one community to another, but between 1918 and 1924 the nation as a whole fell further and further behind in providing reasonable accommodations for its rapidly expanding school population. Beginning in 1925, a more active building program began slowly to reduce this deficit. But even in 1930 there still remained a need for at least four hundred million dollars' worth of new schools.[1]

The depression and schoolhouse construction

Since 1930, every year has seen this deficit grow larger until in 1934 it was approximately one billion dollars. In consequence of this neglect 42 per cent of the public schools are over 35 years old; 8 per cent are over 65 years old; 600,000 children can attend school only part time; 1,000,000 children are housed in temporary, portable, or rented quarters, 1,400,000 children attend in schools which have been condemned as fire or health hazards; 16,000 desired and needed rural school consolidations are held back for lack of funds; and an uncounted number of children are adversely affected by overcrowded classrooms, poor light, and various other phases of insufficient school accommodations.

[1]The statistical analyses on which these statements rest are described in the following publication: National Education Association, Research Division. "The Nation's School Building Needs." *Research Bulletin* 13: 1-36; January 1935.



Future demands for school accommodations

The restoration of normally adequate school plant facilities is one of the major problems confronting public school systems. But this is only one aspect of the problem. We face the necessity not merely of overtaking past neglect but also of providing for still further growth.

In an address at Baltimore recently President Roosevelt announced an educational policy for his administration. This policy has important bearings on schools and school buildings. The announcement was, no doubt, based on a recognition of basic social trends in employment and in industrial organization. These trends are making the gainful occupation of young people increasingly harmful, not only for their own future welfare, but also for the immediate welfare of society as a whole. The recent gains in industry and business have by no means solved the problem of unemployment. The labor of young people is no longer needed. There are plenty of adults available to do the work of the world, leaving the period of childhood and youth free for growth, for play, for schooling. The facts have been recognized for many years by leaders in labor and in business, and by the spokesmen of political parties of all shades of opinion.

In this connection the President said: "We in your government are seeking to extend the school age in every State in the Union and to make it easier for boys and girls to stay in school. Work out for yourselves what would happen if all the boys and all the girls of 14 and 15 and 16 and 17 who are now working in industry found it possible to stay in school until they were at least 18 years old."

In 1930, this writer did "work out for himself," and published, figures on this very topic.[2] At that time the total number of employed children under 18 was estimated to be 2,120,000, a figure which proved later to be in substantial agreement with official census figures. Subsequent experience has lessened the number at work but, if the young people out of school and competing for jobs are included, the round figure of two million is probably not far out today.

The inexorable trend of the times is already bringing these new demands upon the schools. Secondary school enrollments are still increasing rapidly. Every year state school attendance laws cover a larger group of children and the exceptions to these laws are made fewer and are more rigidly enforced. We must offer these youths a worthwhile program of growth in our schools and colleges. Failing that, with the doors of opportunity closed against them, they will find the undesirable village pool-hall, the city streets, and the least desirable commercial amusements ready to take them in.

What provisions can be made for housing these new 2,000,000 students, most of whom will be enrolled in high schools? Some few of them undoubtedly could find places in the existing school plant. But we have already seen that the existing plant, generally speaking, is already overcrowded. The conclusion appears inevitable that most of the new enrollments in the immediate future will need to be met through additional construction.

The schools are thus to be confronted in the next few years with a fiscal problem of major scope. Its solution will have to be worked out gradually through combined local, state, and federal participation.

Social trends and the school building program

Assuming, as we must, that the financial side of the problem can be solved, we return to the conclusion that a major school building program is imminent. In such a time of reconstruction, it is the part of wisdom to take special thought for the guiding philosophy of American education and to examine current social and economic trends in terms of their implications for school building. Some of these trends and implications follow.

1. *Age-distribution of the population.* The number of younger children is decreasing. In 1930 there were fewer children under 5 years of age than in the 5-to-9-year group. This condition did not appear in any census prior to 1930. This suggests that proposals for new elementary schools should, as a rule, be in terms of replacement of obsolete plant rather than in terms of expansion. Study of elementary enrollment trends may suggest in some communities a possibility of remodeling some elementary schools for high-school purposes.

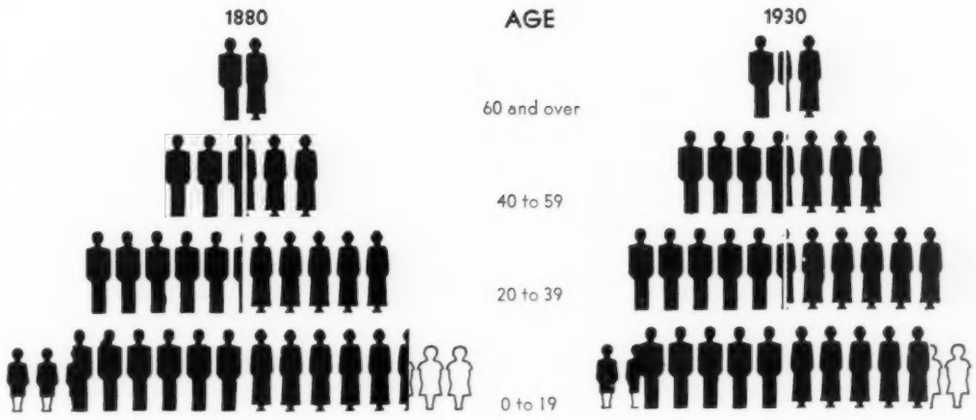
2. *Geographical distribution of the population.* Among the various shifts in our mobile population, none is more significant than the movement of metropolitan populations to the suburban areas. This trend outward is producing new factors of importance to long-range educational planning. For example, in 1930, in all but four of the 96 metropolitan districts, there was a higher percentage of children under 15 years of age outside of the central city than within it. Thus school facilities are drawn into the suburbs, offering an opportunity for merging efforts towards integrated rural and urban school systems covering a large area and serving a large number of children.

[2] *New York Herald Tribune*, December 28, 1930.

AGE DISTRIBUTION OF POPULATION

Each symbol represents 3 per cent of total population.

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3. *Traffic safety.* Deaths of children from automobile accidents have increased until they are exceeded only by deaths from tuberculosis and heart disease. The location of schools with reference to traffic arteries, the construction of pedestrian subways, and proper fencing of school grounds are important preventive measures.

4. *Safety and sanitation in the building.* Schoolhouse planning will doubtless continue to profit by the scientific advances made in the fields of architecture, ventilation, heating, lighting, and sanitation. It will be found socially unwise in view of scientific evidence for pupils to continue to attend school in buildings which fail to meet health standards as to drinking fountains, play spaces, and toilet facilities, and which are not safe against fire, tornado, and earthquake hazards.

A major public works program such as is needed by the public schools is not a suitable vehicle for aimless experimentation with regard to design, materials, and construction. Nevertheless, all tested and worthwhile new developments should be used to the fullest possible extent.

5. *Adult learning.* The remarkable growth of general adult education, both in classroom instruction and less formal methods of study, suggests that schools should be designed with evening use and adult use in mind. This does not mean that the daytime needs of the younger users of the building must be disregarded. The fact that the use of most school buildings averages only about three hours per day is probably the greatest existing waste in American education.

In Des Moines, Iowa, public forums are now in their fourth year of operation under the management of the city school systems. Some 570 adult forums are held every year in the public school buildings. What has been done in one city through enthusiastic leadership can be done and needs to be done throughout the nation. Such forums, it has been estimated, reach no more than half a million out of our seventy-five million adults.[3] Properly designed, equipped, and lighted schools will help to expand and coordinate the adult education program and enable it to function more effectively.

6. *Invention.* The enrichment of classroom activities through the use of devices and inventions has lagged far behind practical scientific applications. Few schools have the visual aids to teaching which might be expected in a highly mechanized age. Recent improvements and lowered costs, however, have tended to increase the use of stereopticons, balopticons, and other devices for the projection of still pictures. Teachers have developed technics for using these machines, not only for commercially developed pictures, but to show to their classes the artistic and scientific achievements of individual pupils. That school systems will need to expand their libraries of flat pictures, motion picture films, and phonograph records in order to keep abreast of rapid changes, appears to be inevitable.

The improvement of communication also offers possibilities for the enrichment of education. In time, the radio will bring to every classroom the voices of statesmen, the languages of foreign nations, and descriptions of events of world-wide significance. Even today the radio places hundreds of children at one time under the instruction of master teachers and brings many small schools the musical satisfactions of great symphony orchestras.

All of these developments should be kept in mind in planning new schools. Space and outlets for installing, storing, and exhibiting modern teaching equipment should be provided.

TRENDS TOWARD LARGER RURAL SCHOOLS

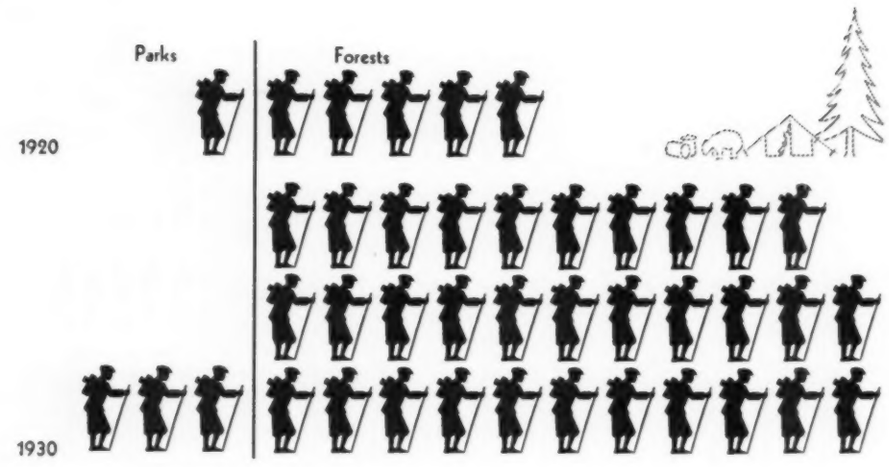
(Figures from *School Life* and *Bus Transportation*)

Year	One-teacher schools	Amount spent for transportation of pupils	Index numbers 1920 = 100: One-teacher schools	Index numbers 1920 = 100: Amount spent for transportation
1	2	3	4	5
1919-20	187,948	$14,537,754	100	100
1921-22	174,945	21,814,744	93	150
1923-24	165,417	29,627,402	88	204
1925-26	161,531	35,052,680	86	241
1927-28	153,306	39,952,502	82	275
1929-30	148,712	54,823,143	79	377
1931-32	143,445	58,077,779	76	399
1933-34	138,542	53,907,774	74	371
1934-35	.....	52,621,881	..	362

7. *Improved transportation.* Between 1904 and 1930 highway mileage increased 40 per cent and surfaced roads increased 360 per cent. This growth and many other improvements in transportation have accelerated the demand for larger units both of school attendance and of school administration. For rural school buildings this means great care in the selection of site and in the determination of the size of the area to be served.

The trend toward larger rural schools is shown in the accompanying table. While the number of one-teacher schools has *decreased more than one-fourth* since 1920, the expenditures for transportation *increased almost fourfold* by 1932.

[3] Studebaker, John W. Plain Talk. Washington, D. C.: National Home Library Foundation, 1936. pp. 74-76.



VISITORS TO NATIONAL PARKS AND NATIONAL FORESTS

Each figure represents 1 million visitors.

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8. *Outdoor learning and leisure.* There is a growing demand for active outdoor recreation for which the schools should assume some responsibility.

If schools are to encourage active recreation and games, they should have both indoor and outdoor play spaces. A survey in 1926-27 of 410 cities showed 48 per cent of the cities failing to report gymnasiums or playrooms. In 1929 a survey in cities of 30,000 to 100,000 population showed that 20 per cent of the elementary schools lacked playgrounds; half of the high schools did not have playgrounds or athletic fields. To meet this condition several states have passed legislation setting up minimum requirements for school playgrounds. It is likely that such standards will be widely adopted.

ARKANSAS[5]

The first part of this survey report is devoted to an analysis of status. This study covers:

1. Trend of the school population since 1920.
2. The number of schools of various sizes as determined by number of teachers and number and percentage of pupils in each size of school.
3. The number of schools of various sizes as determined by the number of pupils in each size of school and the total number of pupils in these schools.
4. The number and percentage of pupils who are of normal age, under age, and over age for their grades, in one-room schools and in schools having more than four teachers.
5. The number and percentage of pupils enrolled by grades in one-room schools and in schools having more than four teachers.
6. The number of schools with various term-lengths, and the number and percentage of pupils in these schools.
7. The number of schools of different classified ratings, both elementary and high schools, and the number and percentage of children in each classification.
8. The number and percentage of teachers receiving various amounts of training.
9. The number and percentage of teachers receiving various annual salaries.
10. The number and percentage of pupils living in districts having various assessed valuations of taxable property per child.
11. The cost of instruction per child in various schools.
12. The amount of assessed valuation of taxable property covered by various tax rates.

The second part of the survey plans a reorganized school system. The following preparatory steps were taken:

1. Maps of each county were made showing roads, streams, cities, towns and villages, boundary lines of school districts, locations of school buildings and the distribution of school population 6 to 17 years old, and the location of each child.
2. Centers of population were determined. A plan was made for the disposition of all present schools. The location of school buildings was determined and the school to which each group of children were to go was indicated.
3. The size and type of school to be maintained at each selected location was set forth.
4. The bus routes necessary to transport all children to the designated schools were determined.

KANSAS[6]

In November 1934, the Kansas State Planning Board, using relief labor, undertook a survey of the physical condition of school buildings. This project had the approval and support of the State Superintendent of Public Instruction. The survey covered 8,326 rural and third-class city districts. Usable reports were received on 8,217 districts.

The check list covered such points as areas available, buildings and equipment, and safety factors. A sketch of the building plan is to be made on the back of the sheet. The returns from this questionnaire are given in the report in tabular form, showing deficiencies in recreational equipment; age and general condition of the different buildings; and sanitary factors such as water supply and sewage disposal.

The details gathered for the 105 counties of the State have been laid before the Supervisor of Engineering of the Kansas Emergency Relief Committee. Through his office they will go to the local County Poor Commissioners with the suggestion that they cooperate with the County School Superintendents in the formulation of work projects to improve conditions. A sketch of a model rural school plant is included at the end of this report.

OHIO[7]

Two new studies are being conducted by the State Planning Board. One is a study of the "physical elements which enter into the plan of our present educational system."

[5]Arkansas State Planning Board. *Preliminary Report.* Little Rock: the Board, September 1934. pp. 179-89. Typed. *State Planning for Arkansas: Second Report.* Little Rock: the Board, March 1935. pp. 231-37, 244-52. Mimeo.

[6]Kansas State Planning Board. *Progress Report.* Topeka: the Board, September 1934. pp. 5663. Mimeo. and *Rural Schools in Kansas: A Study of Their Physical Condition and Recreational Equipment,* Topeka: the Board, March 1935. 22 pp. Typed.

[7]Ohio State Planning Board. *Preliminary Report on a Series of State Planning Studies.* Columbus, Ohio: the Board, August 15, 1934. Section 8, "School Plant Planning," pp. 1-8. *Progress Report on State Planning in Ohio.* Columbus, Ohio: the Board, Part 9, pp. 291-95. *Progress Report.* Columbus, Ohio: the Board, April 1935.

Playgrounds, however, should ultimately be only a first step in broadening our concept of education so that it includes many worthwhile activities outside the four walls of the school. The school plant of the future may include summer camps, swimming pools, community houses, and playing fields as well as the school building itself.

Educational and social planning

Under the stimulus of the National Resources Committee, planning agencies have been set up in 45 states. These agencies were at first primarily concerned with such natural resources as land and water power. More recently their attention has been turning to problems in the conservation of human resources as well.[4] Their work thus offers an excellent opoprtunity for the coordination of social and educational planning. By way of illustration, summaries of a few state planning reports are given on pages 428, 429.

In the words of the Ohio planning board report, "There must be a relationship between the location, distribution, and organization of educational facilities in a county and the physical, social, and economic conditions obtaining therein. The standardized type of educational system, inherited from early days when economic and social conditions and the mode of living were more or less uniform and the state could not possibly fit the widely differing conditions that obtain at present in the various parts of the State either in point of school plant development or the education imparted, is inadequate. It is highly improbable that a school system and the kind of education appropriate in an urban-metropolitan county, for example, can be suitable in a sparsely-settled rural county containing largely submarginal agricultural land."

In summary, some of the new demands in school housing may be stated in question form as follows:

1. How serious is the existing shortage of school buildings?
2. At what educational levels and in what parts of the country is this shortage most serious?
3. What is the probable future trend with regard to school enrollment?
4. How can present shortages and future needs in school building construction be most adequately and yet economically financed?
5. What modern social and economic tendencies have implications for school plant planning?
6. How can school planning be most effectively integrated with planning in other social and economic areas?

[4]National Education Association and Department of Superintendence, Educational Policies Commission. *Activities of State Planning Boards Relating to Public Education.* Washington, D. C.: the Association, March 1936. 35 pp. Mimeo.

The second is a comprehensive survey of certain type counties.

In connection with the first study new school maps of Ohio are to be made. The second study is mainly concerned with the organization and administration of the schools of certain type counties. This survey has already begun in six selected counties. "It is hoped to be able to demonstrate by means of these studies the necessity of rationalizing the school plant of the state and the economies resulting from such rationalization."

A questionnaire relating to school buildings was directed to the 2,007 school districts in the state as part of the plan to develop a public works program. The State Department of Education circulated the questionnaire.

Analysis of the returns shows the total estimated costs for all new buildings, additions and remodelings. This figure is given as $64,378,458, the estimate of local authorities of cost of new buildings and improvements needed within the next five to ten years.

TENNESSEE[8]

This survey covers primarily the physical set-up of the elementary schools of the State, but includes incidentally the high schools of the counties when they are reported by the county superintendent.

Aim of the study:

1. To present the facts as they appear in the different source studies.
2. To show the financial ability of the various political subdivisions of the state.
3. To show the total investment in physical property per county.
4. To show the per capita investments per pupil enrolled and the comparative standing of each county with the state average.
5. The condition of the buildings and the estimated cost of rehabilitation.
6. The possibilities of consolidating plants and all pertinent information thereto.

Methods of procedure: Data were compiled for each of the 95 counties of the State. Buildings in use were classified according to age of building, material of which constructed, and type of school housed in the building. The questionnaire asked county superintendents to report on:

a. Any possible consolidations that might be made within their county.

b. Anticipated buildings, estimated cost.

c. Needs for repair work on buildings and estimated cost.

Replies were obtained from 80 per cent of the county superintendents. The information from the county superintendents was supplemented by data from the Public Works Administration which listed all projects that might be carried on under the Works Relief program soon to be instituted.

A report which is to follow will cover the following points: (1) legal provisions for financing schools, (2) training and certification of teachers; (3) statistical studies and interpretation of the fiscal administration of the educational system; and (4) suggestions for a planned efficiency in educational matters.

VIRGINIA[9]

The Virginia report contains two sections which deal with school buildings.

1. *County school buildings.* The Division of School Buildings of the State Department of Education, assisted by the Virginia State Planning Board, has made a survey of the county school buildings in the State. Twenty-six items of information were collected covering such points as number of pupils transported to the building, type of school, number of acres in site, adequacy of playgrounds, indebtedness, heating and sanitary equipment, etc. A series of 100 maps has been prepared showing the approximate locations of the schools and their use.

2. *City school buildings.* Future problems for Virginia cities are suggested:

a. In a few cases, the need for new or increased facilities, especially in the outer sections of the larger cities.

b. Readjustments as to basic facility types, for example, probable increases in high school accommodations and reductions in the provisions for the elementary grades.

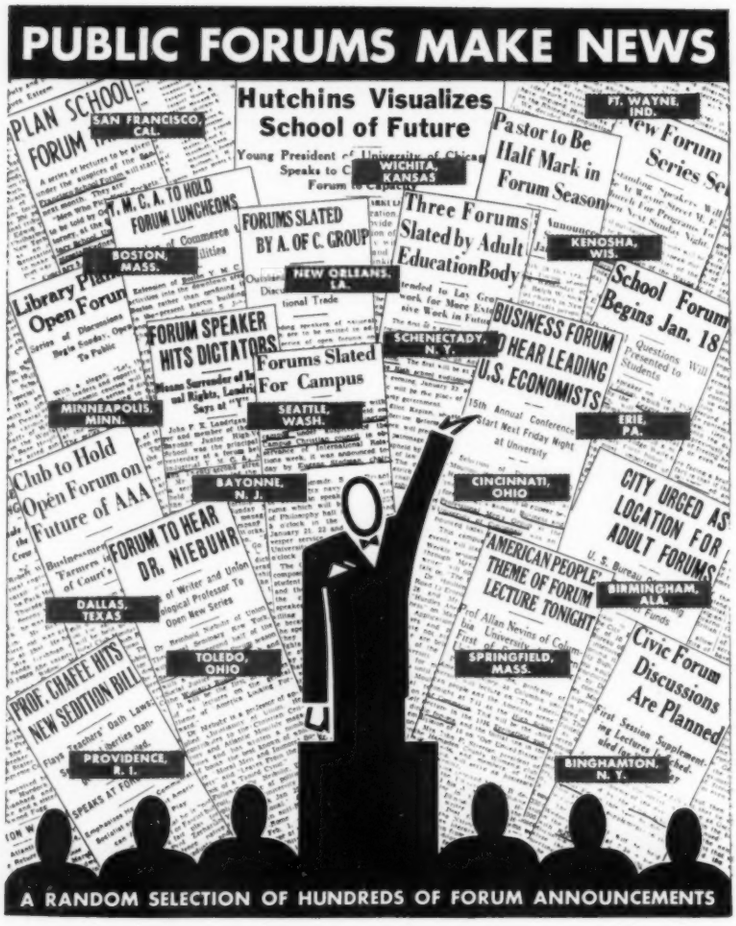
c. Replacement of obsolete accommodations.

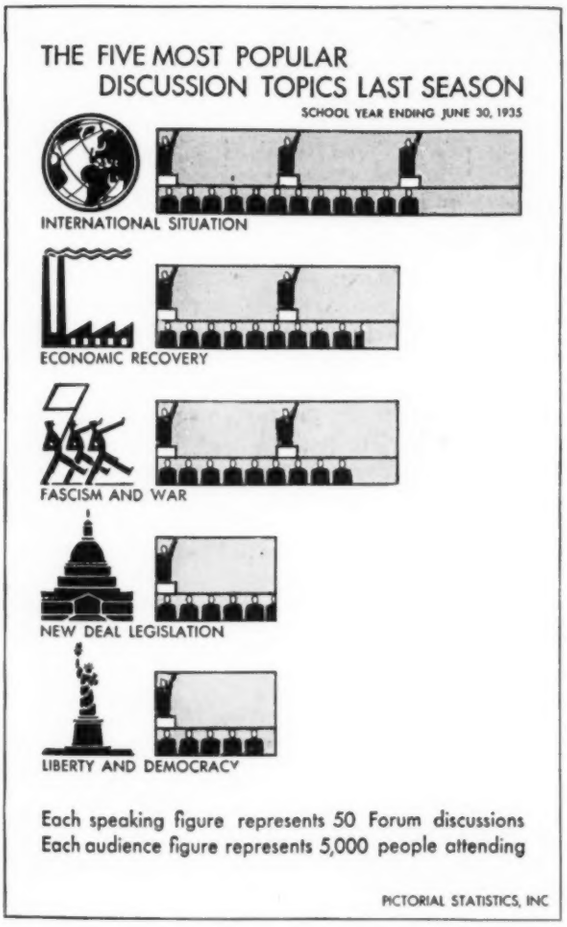
d. Readjustments made necessary by annexations of the urban areas of the surrounding counties.

Future city school populations are predicted. A table shows enrollments and attendance for cities. This is illustrated by a figure. The number of school buildings in cities, 1933-34, is given for both white and negro schools.

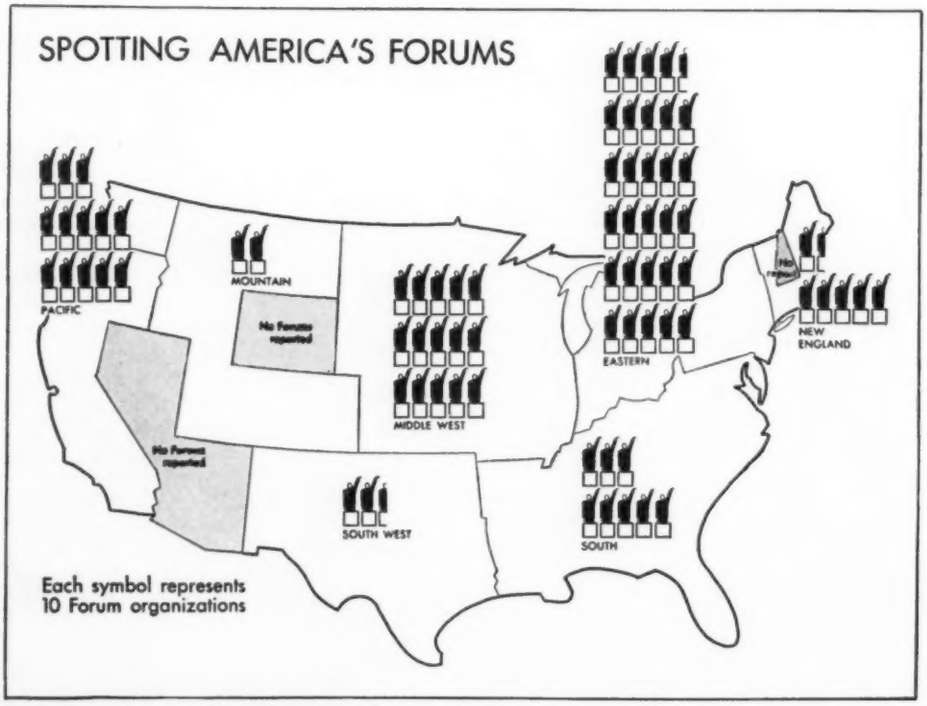
[8]Tennessee State Planning Commission. *Preliminary Survey of the Physical Equipment of the Schools of Tennessee.* Nashville: the Commission, June 20, 1935. 402 pp. Typed.

[9]Virginia State Planning Board. *Report on Education.* Vol. VI. Richmond: the Board, September 1, 1935. 151 pp.





A NEW FACTOR IN THE AMERICAN SYSTEM OF EDUCATION



The U. S. Office of Education reports in the April 1936 issue of School Life that a list of more than 1,000 public forums, large and small, has been compiled thus far in an investigation which is still in progress. The graph at the left shows the distribution of 700 of these forums reported by regions.

Newspaper clippings received daily by the Office of Education indicate an increasing national interest in public discussion. Some universities are already preparing special training courses for the new profession—public discussion leadership.

EDUCATION FOR ADULTS

Illustrations courtesy of SCHOOL LIFE

HOUSING AMERICA'S NEW EDUCATION

LESTER DIX, Associate Director of Lincoln School
JAMES E. MENDENHALL, Research Associate

Part I—THE CHANGING FIELD OF EDUCATION

American education functions today in a complex cultural welter of exciting promises and grave threats. Basic scarcity of all economic goods is, in theory, disappearing. Fewer and fewer of the population are needed to supply the necessities of our living; more and more may be released to improve, to enrich, to enlighten, and to humanize our lives. Our social, economic, and political literacy is increasing as great technical improvements in various agencies of communication build a market for increased enlightenment. With the best newspapers in the world, the most complete system of common education, the most elaborate radio provisions and cinema coverage, and the richest development of voluntary associations to serve every sort of interest, we daily become more able to meet the demand for social intelligence, for entertainment, for cultural expansion and artistic satisfaction.

At the same time great problems confront us. We are not able efficiently to employ our magnificent industrial machinery, particularly that part for basic rebuilding, so-called "heavy industry." Equally, we cannot employ all our people —a problem of significant proportions for older people and an appalling one in the case of the several million never-yet-employed youth. With rapid obsolescence established in our technical processes, we have as yet no comprehensive and rational plan for salvaging obsolete materials or retraining the victims of obsolete occupations.

A changing school program

New educational agencies have lately arrived in response to the new demands. In our judgment, they are here to stay. Five of these should be considered together, for they constitute a single, rounded effort to meet definite needs thrust upon the school by environmental shortages. They are:

(1) nursery education beginning at three years of age;[1]
(2) the all-day school program including food, rest, and play;
(3) a general health program—developmental and preventive rather than remedial;[2]
(4) visual and auditory methods of instruction;
(5) generous provisions for art, handicrafts, and dramatics.[3]

It should be added that what remains of the traditional curriculum has already become broader, more interesting, and more informal in content, in method, and in setting. To the architect these provisions may be taken for granted in the future. No school whether urban, suburban or consolidated rural plant, will be complete without them.

A changing school plant

Certain general architectural changes are already suggested for such a program. The plant will not be complete without a generous and adequately-planned land setting. Transition from indoors to outdoors should be as easy as movement itself. Motifs borrowed from the hospital, the office building, or the warehouse should give way to the restful atmosphere of an adequately-designed home with respect to such things as air conditioning, lighting, soundproofing, furnishing, and decoration. Elements of building flexibility such as movable walls, both interior and exterior; movable but complete technical units such as kitchens, photographic plants, stage lighting sets; in fact, any contribution to the possibility of a changing program, should be experimentally studied. The creative architect should be able to bring to the educator many suggestions of modern facilities for accomplishing these ends.

The emerging educational center

The type of school program just discussed will become increasingly evident regardless of conditions of population. As we build more adequately to meet all the needs of the young, we shall increasingly take certain natural next steps. Reasons for these steps are to be found in the general trends previously noted. Definite evidence exists that these new developments are just around the corner. They are:

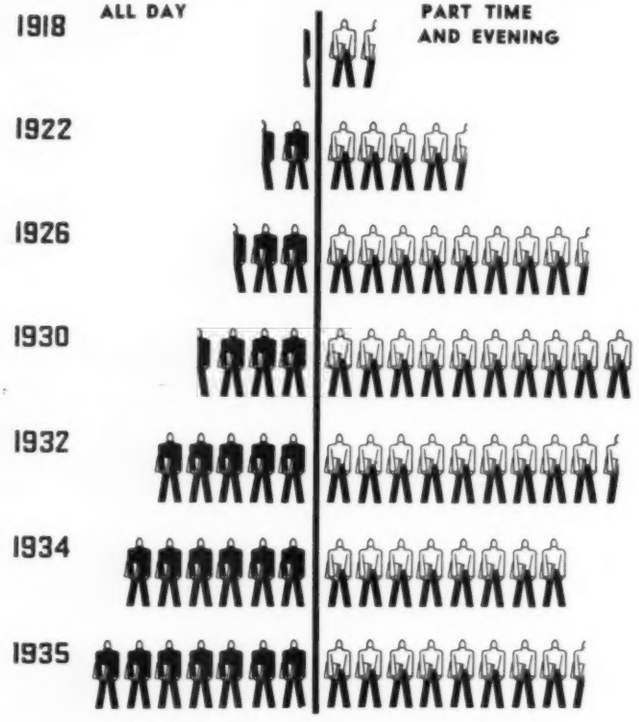
(1) widespread adult education;[1]
(2) publicly provided young people's centers;[2]
(3) a rapid growth of cooperative activities;
(4) closer integration of school and community;
(5) planned community life.

Taken together and including the replanned school, these all point to the school as a center of the people's living—as in medieval times the individual and common activities revolved around the church. Thus, the "child-centered school" leads to the "school-centered community."

[1]The White House Conference reported that in 1930 there were only 343 nursery schools with a total enrollment of some 6,500 children. By 1934, the Federal Emergency Relief Administration had increased the number of schools to 3,000 and the number of children cared for to 61,000. Yet 7,000,000 children of nursery school age today are not in school.
[2]According to the U. S. Office of Education, about 22 per cent of America's school children in 1935 were undernourished, inadequately clothed, and in need of medical and dental attention.
[3]See especially Art Education Today, 1936. Bureau of Publications, Teachers College, Columbia University, New York, 1936.

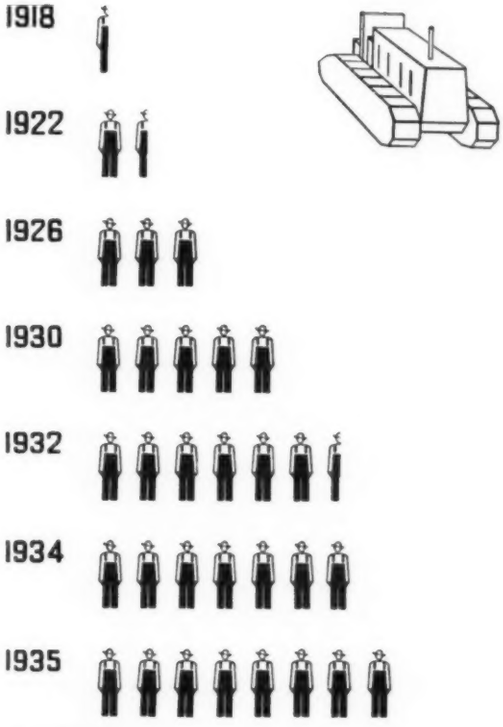
[1]The U. S. Office of Education in *School Life* for April 1936, reported it had compiled a list of 1,000 public forums scattered throughout the nation. See also John W. Studebaker, *American Way; Democracy at Work in Des Moines Forums.* McGraw Hill Book Company, New York, 1936.
[2]Such centers can help serve the 5,000,000 young people now unemployed, as reported by the U. S. Office of Education in *School Life* for December 1935.

PROGRESS IN VOCATIONAL EDUCATION



Total enrollment in vocational schools

Each symbol represents 80,000 students enrolled.



Agriculture

Each symbol represents 40,000 students enrolled.

The community of the future

Certain characteristics may be prophesied for such a center. It will draw to itself not only educational but recreational activity, and it will provide for people of all ages as family life and school activities tend to be reconstructed in terms of a living community. Young and old will again be brought together, as they were in the days when each home formed a more or less self-sufficient community. A part of parent education will be better to understand, to play and to live with the young, and the young will again have a significant part in adult activities.

This new community will be inclosed safely within major traffic lanes, and not divided by them. We shall face the fact of our increased mobility and our complex transportation and provide for them safely and adequately, and cease trying to live, play, and sleep in the same space we use for hauling freight and moving ourselves from place to place.

A required part of every such community will be a generous amount of open land, planned for rest, for recreation, and for that contribution to living made by the trees, gardens, and lawns. The servicing of such communities will be as well planned as their facilities for enjoyment. The family shopping need not involve a coarse adventure into ugliness, noise, and stupidity. Again, the architect should be able to expand and to complete this suggestion.

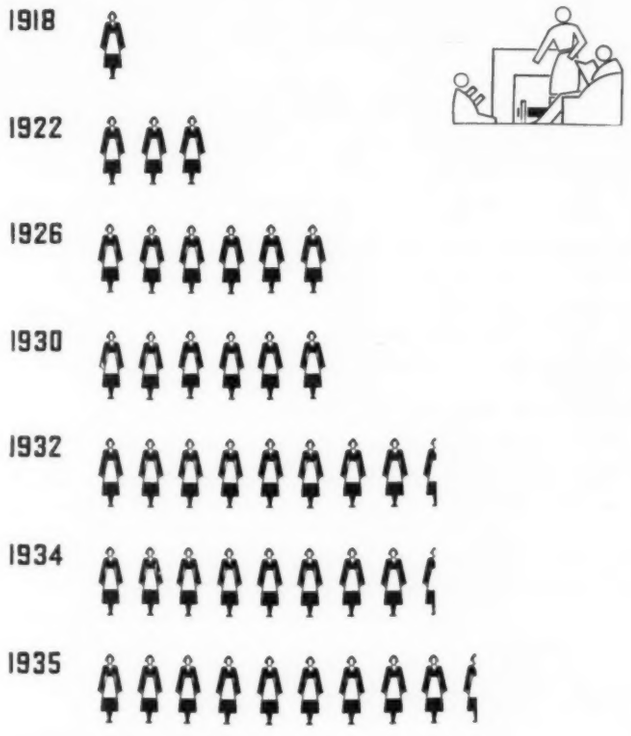
Tasks in community planning

Such communities as here suggested will exist in three major types of setting. It is altogether likely that they will first develop in suburban areas, for many reasons too obvious to be stated here, and there is already sufficient evidence of such a tendency. The regions of desperate need are our huge confused cities and our barren rural wastes. The great cultural needs of the rural population, if not their actual economic salvation, may turn upon planning and helping to consolidate them into recognizable nuclei for living. If any sense is to be made of urban living, the sprawling mass must be broken down and rebuilt into generously spaced neighborhoods which have some organic relation to the activities of their inhabitants.

Many possibilities may aid in accomplishing this task. There is no longer any sufficient reason for crowding all industrial processes into the center of urban life. Facilities for transportation of goods, for distribution of power as well as specialization in industry, and the need for reducing huge overhead land values due to congestion, all point in the desired direction. City traffic is well nigh strangled today by too many and too constricted traffic routes. Fewer and better ones, spreading congested populations over wider areas, with modern transportation, will solve the city problem—if the planning, engineering, architectural mind can be freed from the domination of those interests which are best served by the present congestion.

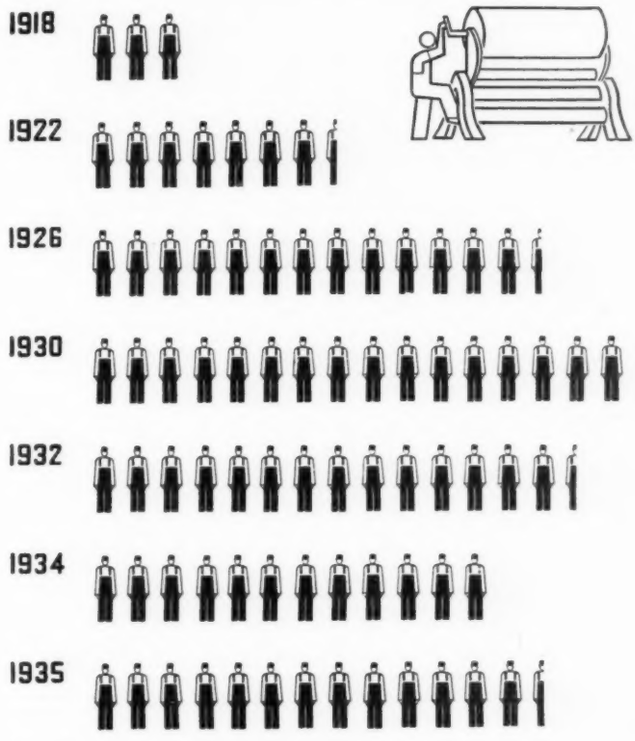
We do not suggest that the architectural and engineering pattern of expression for the new communities be standardized. The widest possible variation is desirable. Conceivably such a community could be admirably designed in a single apartment structure in a congested area, if by such concentration generous surrounding space and adequate traffic facilities could be provided. This apartment community, because of cost factors and likeness to existing conditions, com-

Charts prepared by WPA Project 273 directed by Rudolf Modley, and reproduced from SCHOOL LIFE



Home Economics

Each symbol represents 40,000 students enrolled.



Trade and Industrial

Each symbol represents 40,000 students enrolled.

pares favorably with the suburban community as an opportunity to move in the right direction.

The architect needs to envisage the whole of the coming community, if he is to deal properly with the problem of school housing. He is already engaged in the reconstruction of housing for families, for trade, and for industry. No one of these types of housing can be well designed unless account is taken of the relationships among them. If we are to meet our major social, economic, and political problems with our accustomed democratic outlook, a greatly expanded and more significant educational program must be geared into all living activities and located in their midst. Our major suggestion is that the school architect utilize every favorable opportunity for interesting the policy makers in existing communities of optimum size and circumstance to experiment with this conception.

Part II—PLANNING THE NEW EDUCATIONAL PLANT

However necessary it may be to rebuild the school in terms of the coming community, it is imperative to recognize that there is an immediate necessity to replace our obsolete school plant. According to the National Education Association, "Additional building facilities for 2,700,000 pupils are required merely to replace condemned and temporary structures and to provide full-time accommodations for all pupils. Likewise about 16,000 consolidated schools ought to be established in the interest of some 5,000,000 rural children now attending poorly equipped, inefficient schools."[1]

In working out a building program for these millions of children, architects should carefully consider the changes which are taking place in the field of education. Otherwise, these new buildings may within a few years become as outmoded as many of the nation's buildings are today. For example, the National Education Association reports that about two-fifths of America's school buildings were erected before 1900. These buildings may have provided well for a curriculum made up of the three R's, but they do not furnish adequate facilities for arts and crafts, home economics, industrial arts, and science. They lack lunchrooms, medical quarters, rest rooms, gymnasiums, swimming pools, and adequate outdoor play space. The building sites were selected in an age of the pedestrian and the horse and buggy and, therefore, are poorly located for an age of automobiles. In short, these buildings are obsolete from an educational, technical, and social point of view.

[1] *The Nation's School Building Needs.* Research Bulletin of the National Education Association, Vol. XIII, No. 1, January 1935.

STATUS OF AMERICAN YOUTH-1935

Each symbol represents 1,000,000 youths, age 16-24

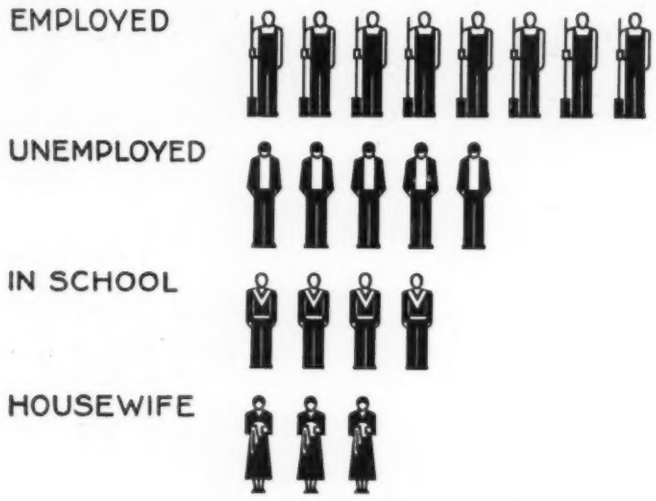


Chart Prepared by BUILDING AMERICA

Source of data: United States Office of Education

Schools designed as instruments

To meet the changing needs of education, architects should develop a new type of school building. Such a building should be primarily designed to serve its function as a place where children are learning and growing. This function should not be subordinated to the external appearance of the structure. All too many communities have built schools as monuments to civic pride and in doing so have overlooked the fact that above all the school should be a place where children are educated.

This new type of building should be designed for use during a relatively short period of time, say for 10 to 20 years, rather than for a period of 40 to 50 years, for which most of our present-day buildings are planned. Rapid obsolescence is particularly necessary in a time of great educational and social changes. Today many communities find themselves saddled with obsolete buildings because they spent heavily to pay for the structures and issued long-term bonds to cover these expenditures. While the school buildings are outmoded, they cannot be replaced because these communities have not yet paid for them. Had the communities erected structures which in 20 years had become obsolescent and paid for, they would have been in a financial position to build modern structures.

Schools designed for mobility

The modern type of school should be constructed of the best materials that science and industry have developed. It should make generous use of steel, glass, and other composition materials that can be manufactured in standard units and readily assembled on the spot at minimum cost.

There is no reason why architects and the building industry should not work out a type of building made up of a number of prefabricated units. As the school population grows and the curriculum changes, new units can be added. Units can be withdrawn from use as the need disappears.

Such prefabricated school buildings will be readily adapted to great geographic shifts in America's population. Some types might be of a light and portable nature, although far more comfortably made and far better-equipped than the tent, wooden, and tin structures now in temporary use in many communities. Such buildings would be easily adaptable to population shifts. They could, for example, be erected in the coal towns of Pennsylvania which are fast becoming obsolete. As these "sick" coal towns are gradually abandoned, and the inhabitants move to a booming industrial center like Detroit, it would be possible to dissemble the buildings and reassemble them in Detroit where needed, and at a very low cost. These portable school dwellings might also be used in the South where millions of children are badly in need of good school-housing. If and when the Rust cotton-picker displaces the labor of 10,000,000 or more Negro people, they together with their school buildings might be transported to regions of new and expanding industries.

Schools and national planning

The program for building schools must be seen in relation to the development of planned communities throughout America. School buildings represent a capital investment which may retard the decentralization of our overcrowded cities and the consolidation of farm homes in rich agricultural areas. When a community spends $1,000,000 on a new high school, this investment may accentuate overcrowding rather than reduce it. Therefore, it is highly desirable that the program for building new schools and that for developing new communities be closely integrated.

The need for federal aid

A rehousing program for the school children of America is not of interest solely to the educator. By common consent, "heavy industry" is the laggard in our economic recovery. Rehousing is at once the outstanding need of the people and the most promising opportunity for the reemployment of our industrial machine, our idle capital, and our unemployed labor.

To provide better schoolhouses for our 2,700,000 city children and our 5,000,000 rural children would require, at $400 each,[1] about $3,000,000,000. No substantial part of such a program will be financed by the independent efforts of communities, even with equalizing aid by states. Professor Paul R. Mort reported a variation of per capita expenditure for education in 1930, ranging from $36.88 in Nevada to $7.50 in Georgia.[2] These differences are the direct result of actual capacity to pay in the various states and localities, as is made clear by Mort.

Federal aid is required for even a beginning of an adequate school building program anywhere in the United States. Only a national plan of school building would be capable of meeting the need. Economically, state and national aid are fully justified by the fact that the school building for Tulsa, Oklahoma, may cause the reemployment of idle labor in Longview, Washington; Toledo, Ohio; or Newark, New Jersey. The building industry, as every other, operates upon a national scale, and with national ramifications. Capital, plant, and labor may be affected anywhere by a substantial building program in any location. Thus our economic necessities and the bitter need of our school children both point to a courageous attack upon rehousing America's school children.

[1]This is considered to be a reasonable estimate for housing each school child, according to *The Nation's School Building Needs*. The National Educational Association, January 1935.

[2]Paul R. Mort. *State Support for Public Education*. American Council on Education, Washington, D. C., 1933.

PORTFOLIO

ROOSEVELT SCHOOL, SANTA MONICA, CALIFORNIA. MARSH, SMITH & POWELL, ARCHITECTS.

CENTERPORT SCHOOL, CENTERPORT, NEW YORK. JAMES VAN ALST, ARCHITECT.

SCHOOL-HOME FOR SMALL CHILDREN, BALBUENA, MEXICO CITY. JOSE GARCIA AND ENRIQUE DE LA MORA, ARCHITECTS.

McCOOK JUNIOR COLLEGE, McCOOK, NEBRASKA. SHELDON BRUMBAUGH, ARCHITECT.

EXPERIMENTAL ELEMENTARY SCHOOL, BELL, CALIFORNIA. RICHARD J. NEUTRA, ARCHITECT.

HANOVER SCHOOL, SOUTH MERIDEN, CONNECTICUT. LORENZO HAMILTON, ARCHITECT.

GRADE SCHOOL, LAWRENCE, KANSAS. THOMAS LARRICK, ARCHITECT.

MILTON JUNIOR HIGH SCHOOL, EAST MILTON, MASSACHUSETTS. RALPH HARRINGTON DOANE, ARCHITECT.

PARK SCHOOL, HIBBING, MINNESOTA. J. C. TAYLOR, ARCHITECT.

COBURN COUNTRY DAY SCHOOL, MIAMI BEACH, FLORIDA. L. MURRAY DIXON, ARCHITECT.

COMMUNITY SCHOOL, PICKWICK DAM, TENNESSEE. TENNESSEE VALLEY AUTHORITY, ARCHITECTS.

NORRIS SCHOOL, NORRIS, TENNESSEE. TENNESSEE VALLEY AUTHORITY, ARCHITECTS.

JUNIOR HIGH SCHOOL, WEBSTER GROVES, MISSOURI. WILLIAM B. ITTNER, INC., ARCHITECTS.

THE FUNCTIONAL APPROACH TO SCHOOL PLANNING. BY WILLIAM LESCAZE.

ANSONIA HIGH SCHOOL, ANSONIA, CONNECTICUT. WILLIAM LESCAZE, ARCHITECT; VERNON F. SEARS, ASSOCIATE.

RECENT SCHOOLS



Photograph by Victor Haveman

ROOSEVELT SCHOOL

SANTA MONICA, CALIFORNIA

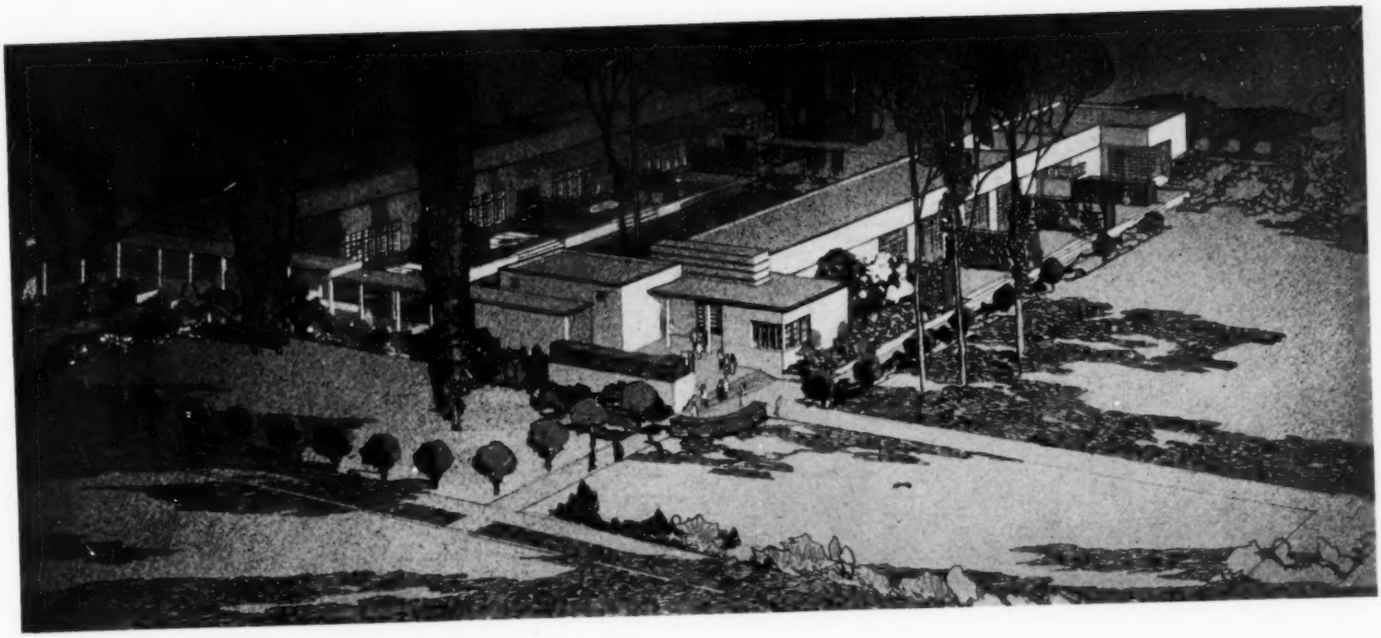
MARSH, SMITH AND POWELL, ARCHITECTS

In view of the fact that children spend more of their daytime hours in the school building than they do in their own homes, the elementary school classroom has been woefully slighted. Why should youngsters warp their sense of beauty by looking at three walls of funereal blackboard and one wall of windows, with a flat glaring expanse of plaster for a ceiling?

Why should teachers have to carry on an activity type of program in new schoolrooms that were designed for drilling? Lately, some tentative moves have been made toward adjusting the room to the program that is being offered within its walls. In fact, the walls are in some cases being moved, opened and otherwise altered, and the program of the classroom allowed to flow beyond their confines.

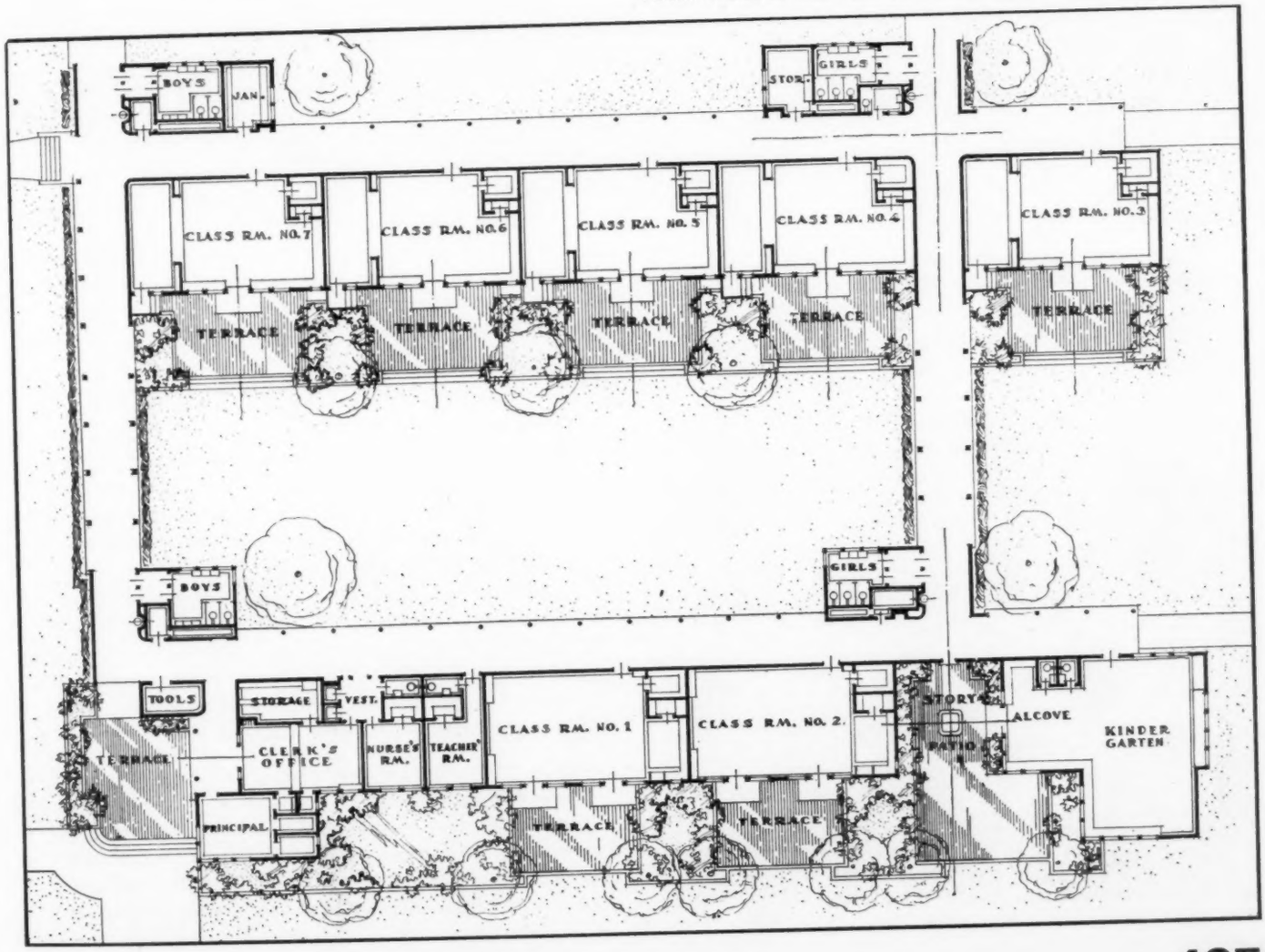
After the Long Beach earthquake, when a general rehabilitation of schools became necessary, the firm of Marsh, Smith and Powell set about reconsidering the problem of the elementary classroom. In this school, the architects met with the teachers and supervisors collectively and singly in "seminars" at which each individual wall, fixture, and case was freely discussed and "put on the pan." As a result, a classroom plan type for elementary pupils and a different type for primary pupils were developed. The cold hand of "standard practice" which has made the hideous elementary school classroom of California identical with the elementary school classroom of Maine and all states between, was not laid upon these classrooms, and some functions of classroom teaching hitherto neglected have been given a place in the planning.

In Santa Monica, where the first of the new type of Southern California schools was developed, a distinction between age groups was attempted. Two new types of classroom were worked out—one for the primary group up to the third grade, and one for the age group from third grade to junior high school. These may be seen by considering the plan of the Roosevelt School at Santa Monica.



PERSPECTIVE SHOWING OUTDOOR CLASSROOMS

PLAN: PORCHES INSTEAD OF CORRIDORS IN THIS MILD CLIMATE





Photographs by Victor Haveman

ROOSEVELT SCHOOL

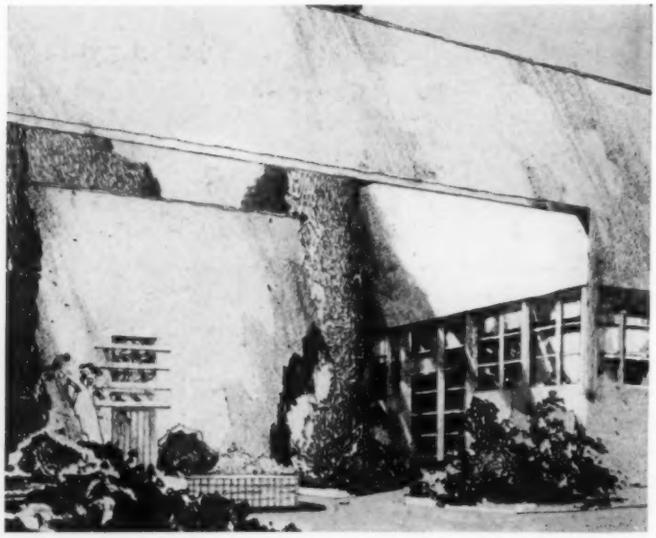
SANTA MONICA, CALIFORNIA

MARSH, SMITH AND POWELL, ARCHITECTS

THE SANTA MONICA PLAN

In the reconstruction of the Roosevelt School, several underlying principles should be recognized:

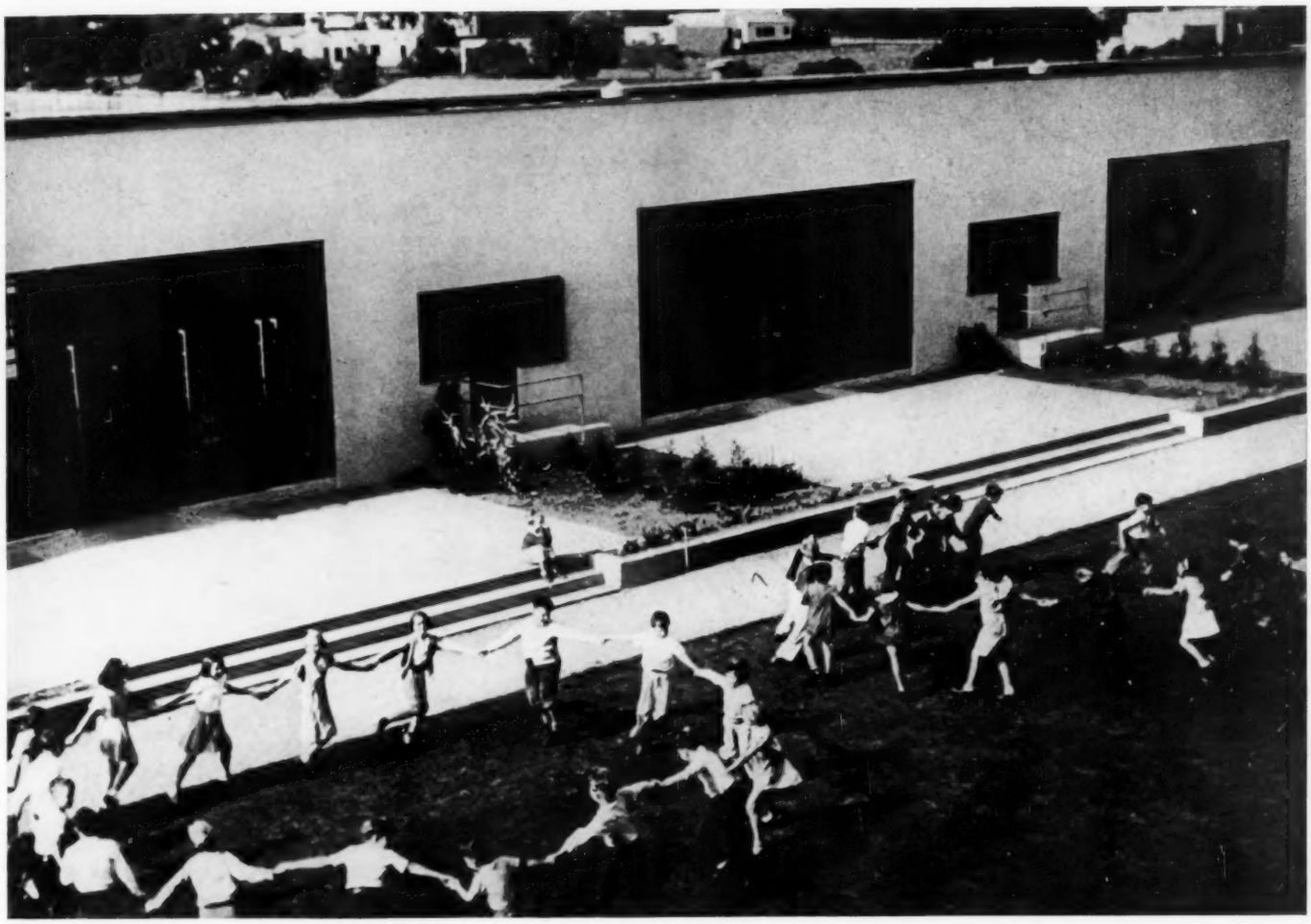
1. In an earthquake area, schools should be designed to protect their occupants as completely as possible.
2. In a California school, even more recognition of outdoor life should be given than heretofore.



3. In order that progress in educational methods may be made effective, the plan arrangement of the classroom should help, rather than hamper.
4. In recognition of new uses and of new materials available, the architectural appearance should be a direct expression, instead of a complement to tradition.
5. Expansion is recognized from the outset as a requirement of a growing population.

Taking these five basic assumptions in more detail, and starting with the earthquake factor in design, the building is kept one story high for the obvious reason that the possible hazard of a second story is thereby eliminated. An additional influence on this point, however, is that it is also possible to develop the combination of outdoor-indoor classrooms for all classrooms in a one-story building. This building is engineered to meet the rather rigid requirements of the new state schoolhouse construction code. Surplus architectural motifs, which have been considered aesthetically necessary in the past, are denied the conscientious architect and he must achieve beauty in his building by qualities of trimness, simplicity of mass and detail, and the studied use of color. Egress from each classroom to the outside is direct.

It is in the relation to outdoor living in California that this plan makes an important contribution. A dozen or so years ago, Santa Monica experimented with French doors in certain classrooms. This idea has been expanded and developed by the architects in conjunction with Dr. Percy Davis, Santa Monica Superintendent of Schools. A paved brick terrace, using brick salvaged



CLASSROOMS OPEN DIRECTLY . . .

from the existing Class C construction buildings, adjoins each classroom. Broad steps lead down to the lawn, and a sense of privacy is obtained by inserting a fifteen-foot-wide planted area between each terrace.

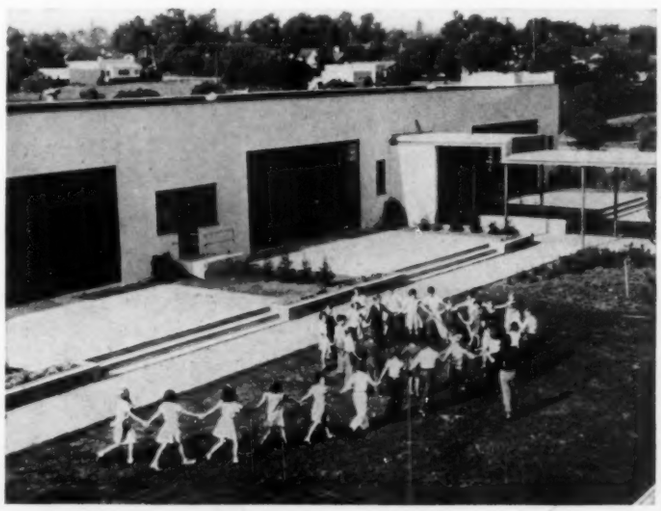
A maximum of light and air reaches each unit of the plan from all sides. Lawns between the wings of the school form a protected special play space for the younger children. It is this factor, perhaps, more than the others, which has caused this plan to be rather widely known as the "Santa Monica Plan."

Architects all over the country and, indeed, all over the world are becoming increasingly aware of the vital importance of using the new as well as the old construction materials appropriately and of the importance of "functional" design—design that expresses, not conceals, the uses of the various portions of the building.

The last underlying principle involved applies principally to growing communities. That is, that expansion should be anticipated. Such expansion should require a minimum of change and expense for existing buildings.

The Roosevelt School is located off the center axis of the plot, and space for future auditorium, cafeteria, and other special rooms is allowed. Its strength in expansibility lies in the fact that the school is composed of self-contained units tied together by shelters, and as the community grows additional units of classrooms are built.

. . . ONTO THE PLAY AREAS

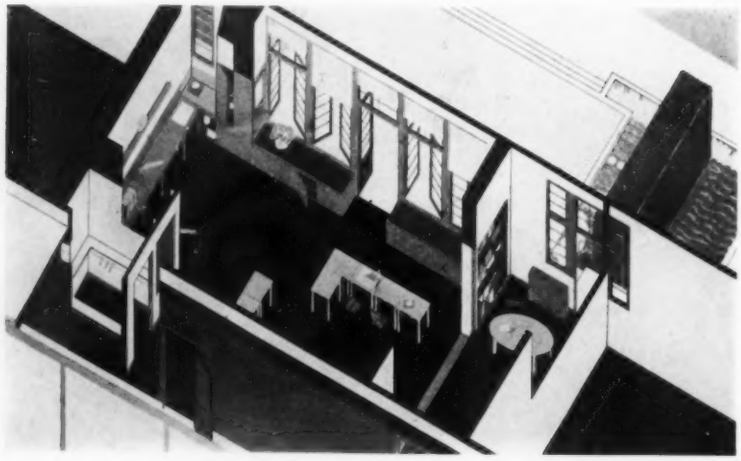




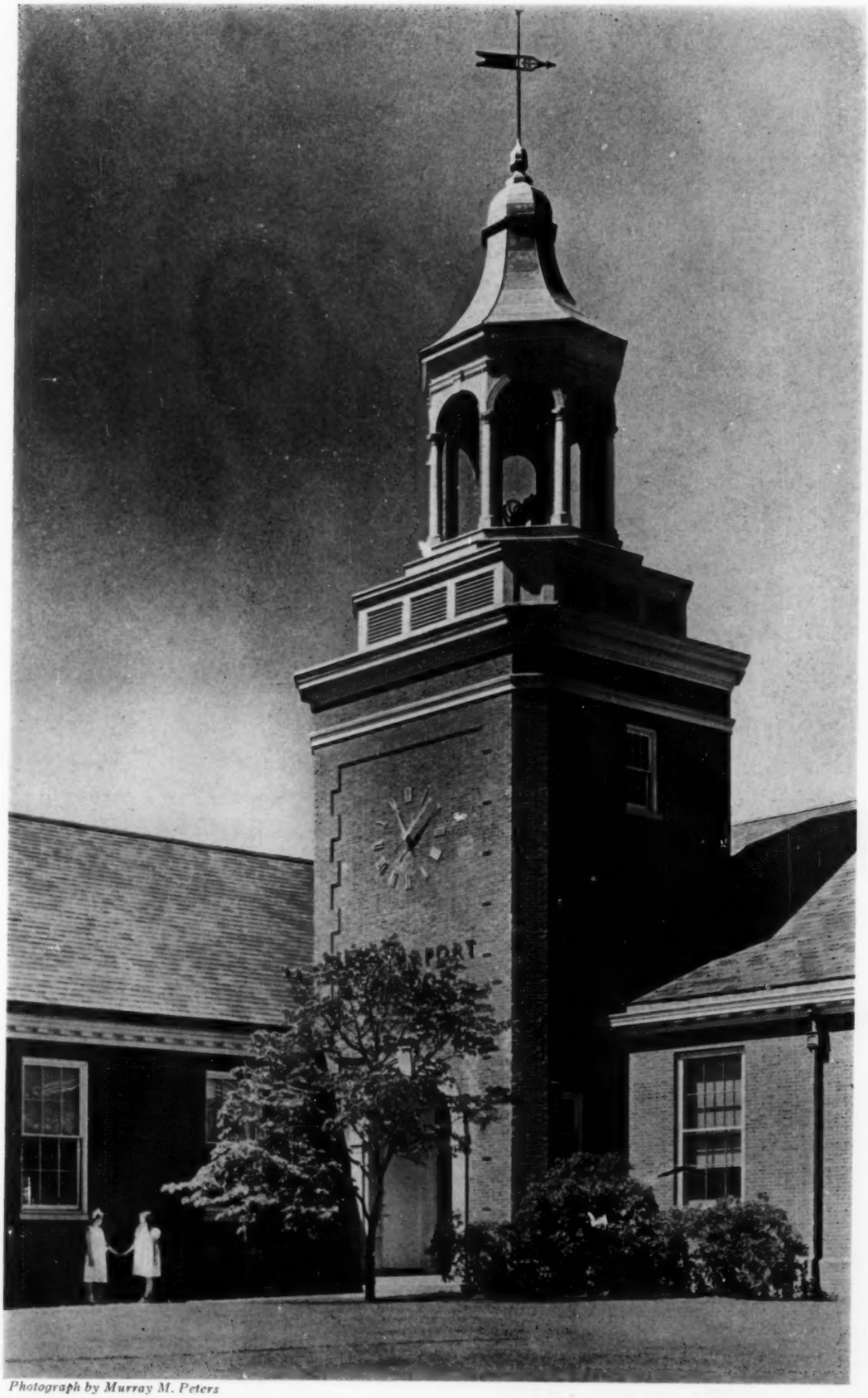
Photograph by Victor Haveman

ROOSEVELT SCHOOL **SANTA MONICA, CALIFORNIA**

ISOMETRIC VIEW OF TYPICAL CLASSROOM



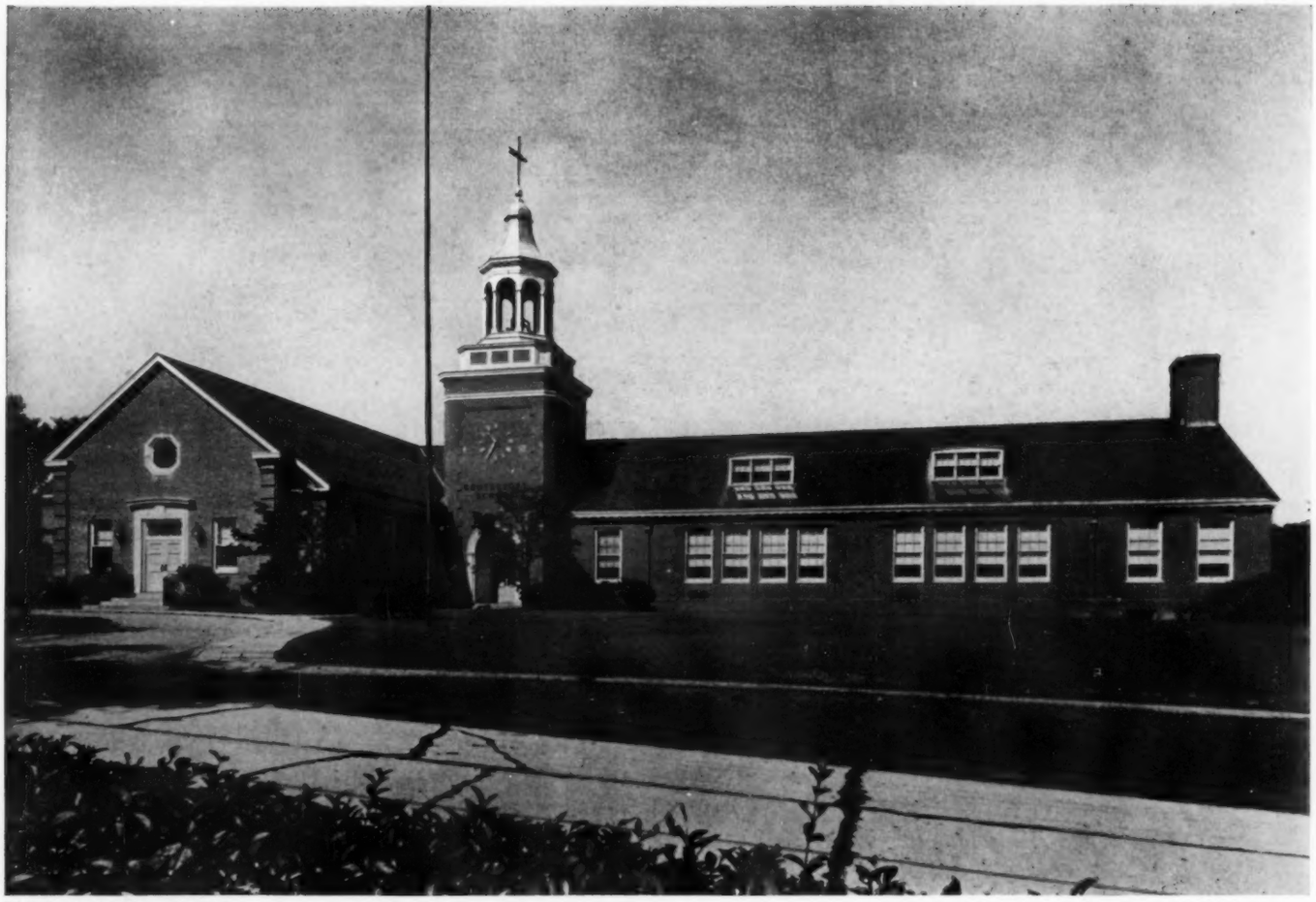
MARSH, SMITH AND POWELL
ARCHITECTS



Photograph by Murray M. Peters

CENTERPORT SCHOOL **CENTERPORT, NEW YORK**

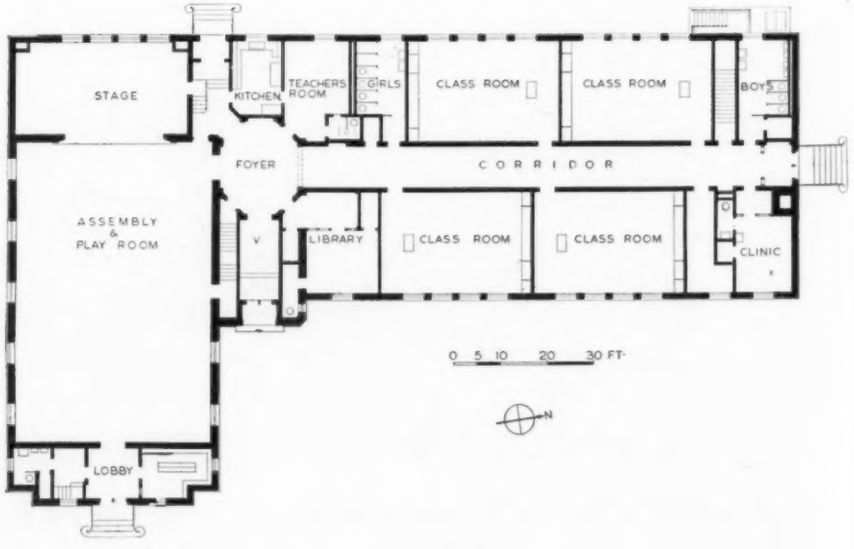
JAMES VAN ALST, ARCHITECT



Photographs by Murray M. Peters

CENTERPORT SCHOOL **CENTERPORT, NEW YORK**

JAMES VAN ALST
ARCHITECT



FLOOR PLAN


CENTERPORT
SCHOOL

CENTERPORT SCHOOL

CENTERPORT, NEW YORK

JAMES VAN ALST

ARCHITECT

This Long Island school was built in 1933 at a total cost, including furnishings and architect's fees, of $95,767.00, or a cubic foot cost of 30½¢. The architect designed all equipment, even down to the stationery and diplomas.

ASSEMBLY ROOM

Photographs by Murray M. Peters





Photograph by Hellen Fisher

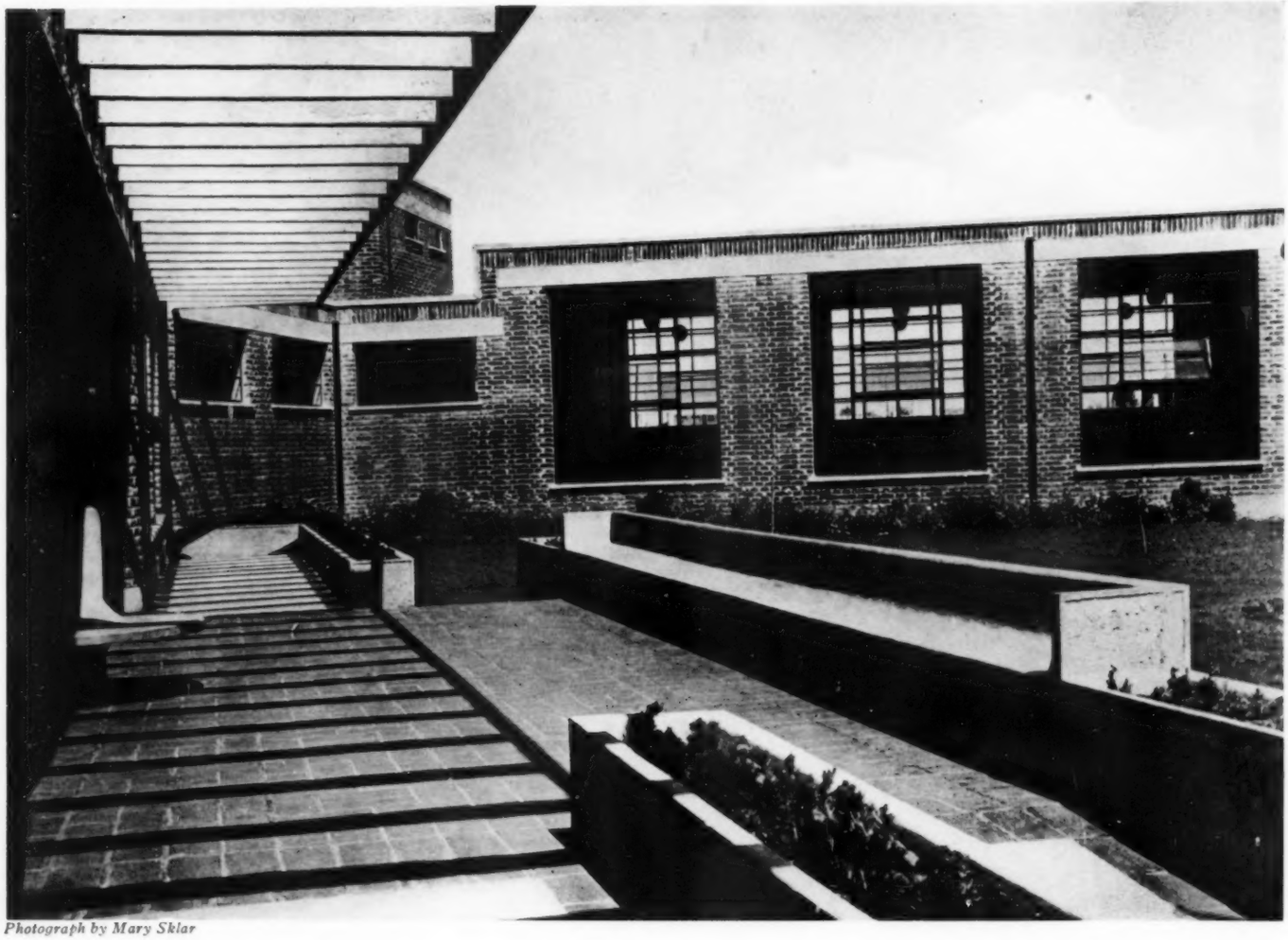
SCHOOL-HOME FOR SMALL CHILDREN

BALBUENA, MEXICO CITY

JOSE V. GARCIA AND
ENRIQUE DE LA MORA
ARCHITECTS

A new-type institution to fill a new social need: designed specifically for children both of whose parents work during the day, this new institution is located in Balbuena, an industrial suburb (of Mexico City). The school is one of a series now being constructed by the Health Department of Mexico City.

Like the housing development (also for industrial workers) which it adjoins, this school plant has been carefully designed to fit the most modern standards in nursery education. The children are under the care of teacher-nurses, who supervise their study, playing, sleeping, and eating. This new type of educational plant is only a part of the progressive educational policies now in effect throughout the Mexican Republic.



Photograph by Mary Sklar

SCHOOL-HOME FOR SMALL CHILDREN

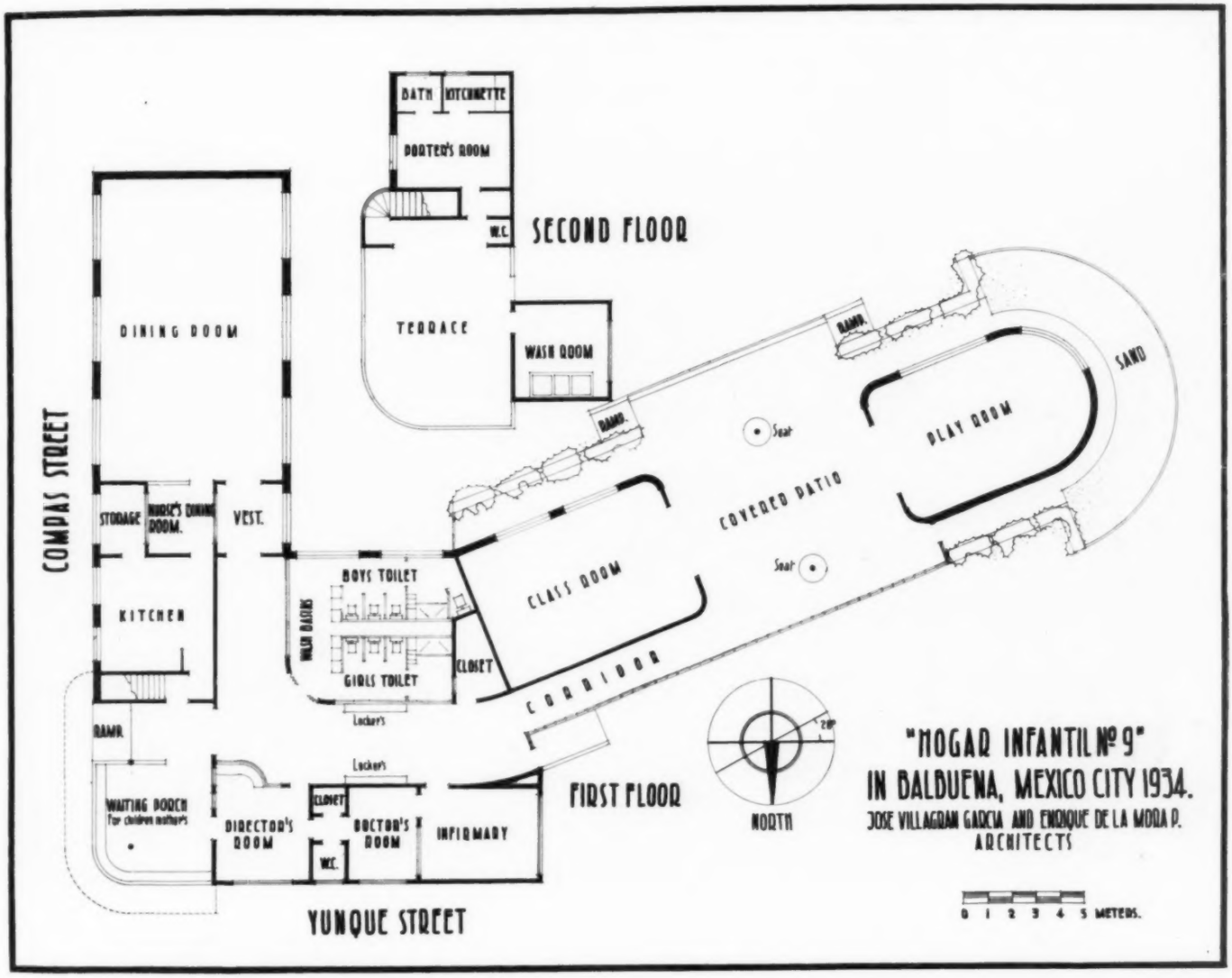
BALBUENA, MEXICO CITY

Photograph by Hellen Fisher

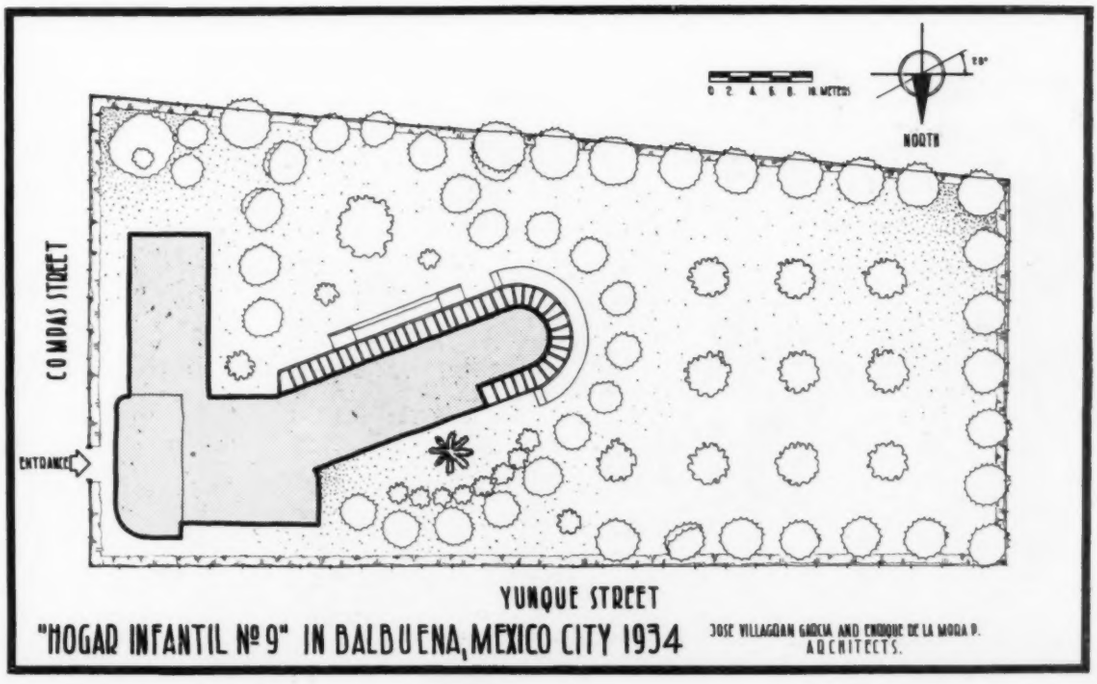


JOSE V. GARCIA AND
ENRIQUE DE LA MORA
ARCHITECTS

LEFT: THE CHILDREN GATHER ON THE SOUTHERN TERRACE; DINING HALL IN BACKGROUND



FLOOR PLAN



PLOT PLAN

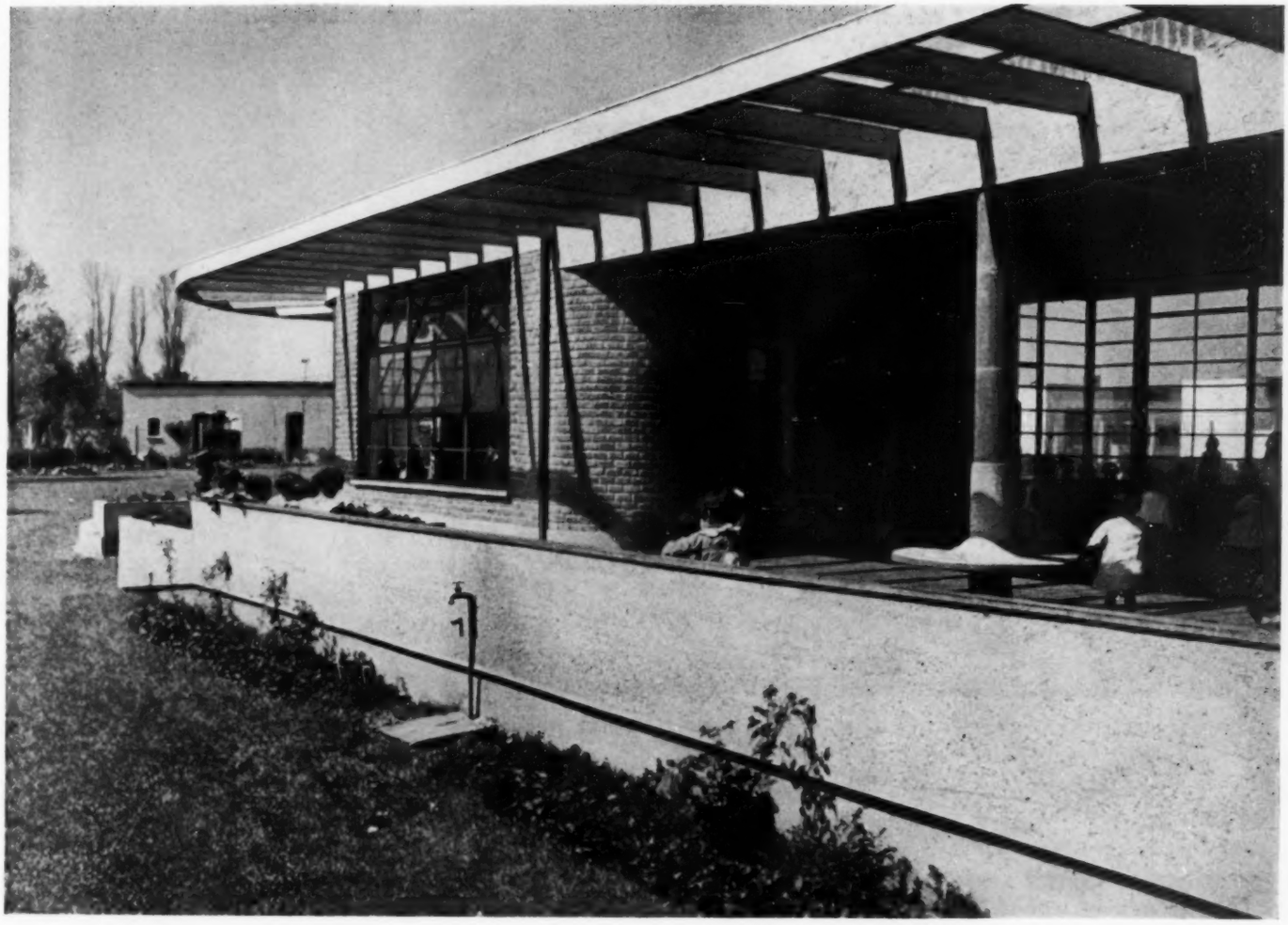


Photograph by Hellen Fisher

SCHOOL-HOME FOR SMALL CHILDREN **BALBUENA, MEXICO CITY**



ABOVE: THE PLAYROOM GETS THE SOUTHERN SUN



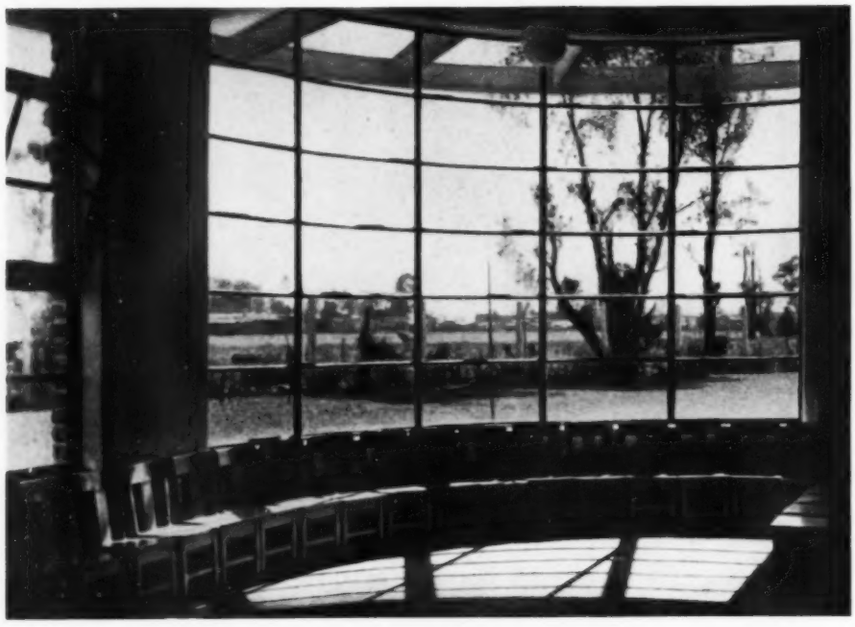
JOSE V. GARCIA AND ENRIQUE DE LA MORA, ARCHITECTS



THE COVERED PATIO SERVES AS A PLAY SPACE IN INCLEMENT WEATHER

SCHOOL-HOME FOR SMALL CHILDREN

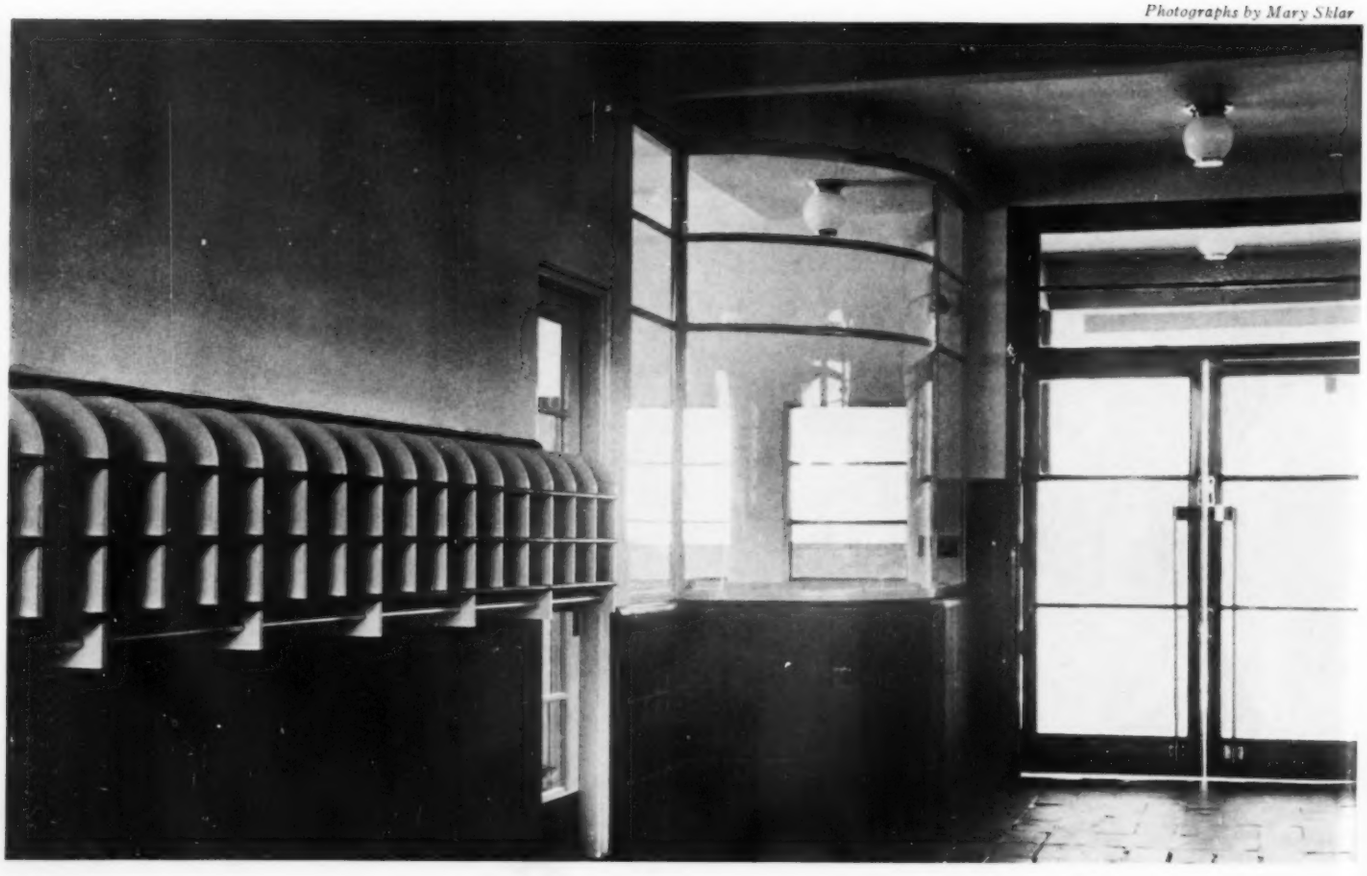
BALBUENA, MEXICO CITY

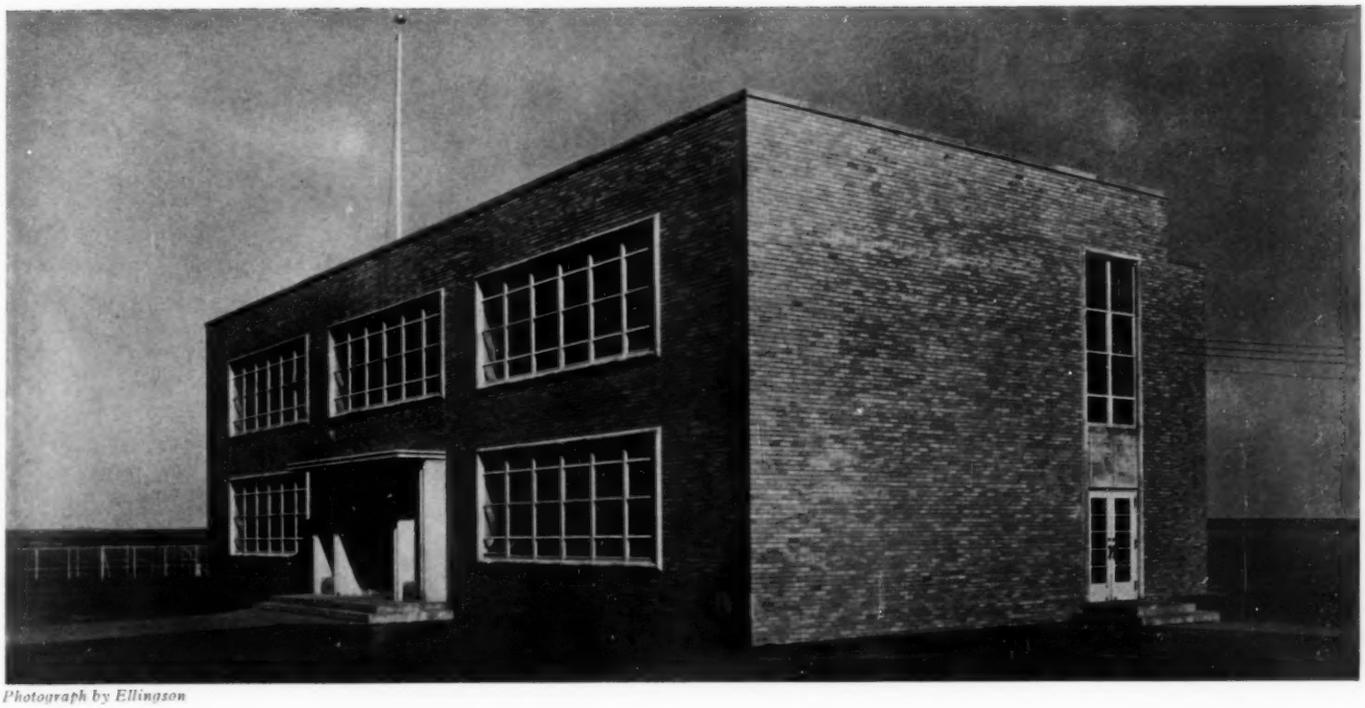


FURNISHINGS THROUGHOUT ARE DESIGNED FOR SMALL CHILDREN

JOSE V. GARCIA AND
ENRIQUE DE LA MORA,
ARCHITECTS

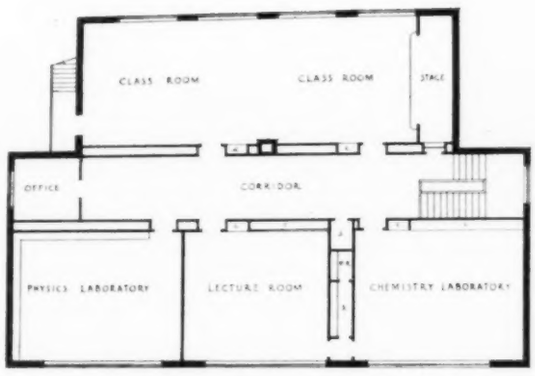
Photographs by Mary Sklar



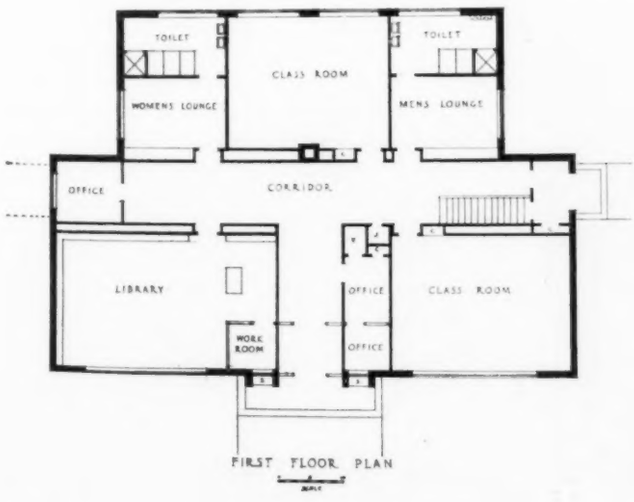


Photograph by Ellingson

McMILLEN HALL, McCOOK COLLEGE — McCOOK, NEBRASKA



SECOND FLOOR PLAN



FIRST FLOOR PLAN

SHELDON BRUMBAUGH
ARCHITECT

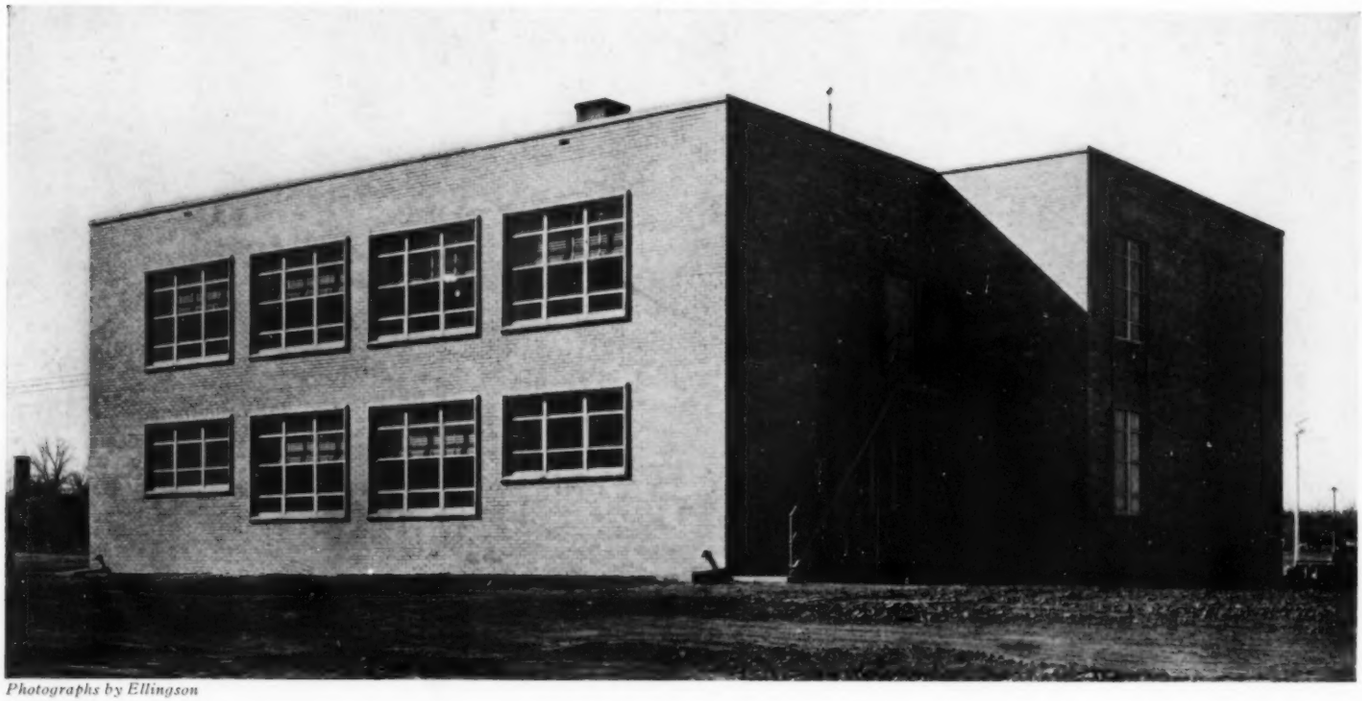
McCook Junior College was established in 1926 and has an enrollment of 125 students. The McCook Junior College building was designed as a memorial to Cecil McMillen, and is the first unit of a proposed future scheme that will include an auditorium, gymnasium, and dormitory.

It seemed desirable to design the building as a complete individual unit in order to preserve its memorial character. The future auditorium and gymnasium may be connected to this building by covered passageways.

The temporary assembly room on the second floor is provided by opening the folding partition between the two classrooms. The teachers' offices at the north end of the first and second floor corridors will be eliminated when future buildings are constructed.

An 8-acre site was secured adjoining the 35-acre city park. Five acres of the site were a ravine that had been used for years as the city dump. The topography of this ravine lent itself to the construction of an athletic bowl. The débris was removed and the bowl constructed as a WPA project.

The design of the Kelley Park was practically completed before the site for the college was acquired, but an effort was made to arrive at a complete unity between park and campus.



Photographs by Ellingson



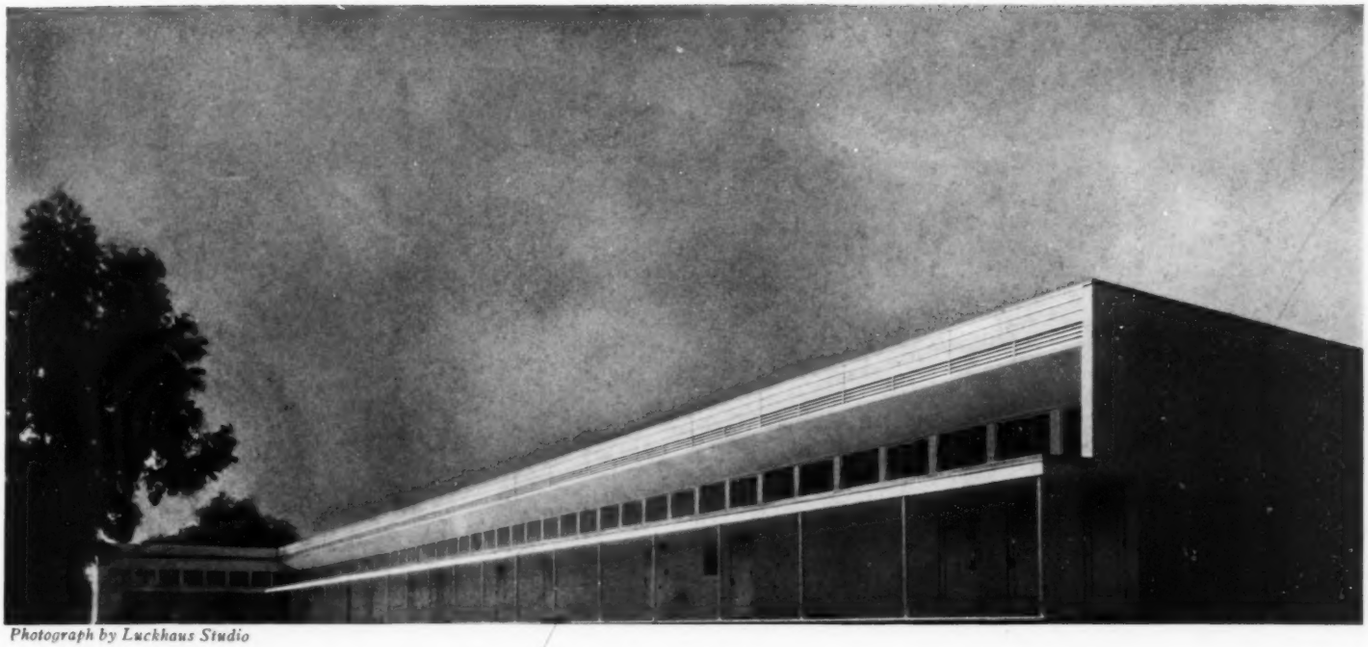


McCOOK JUNIOR COLLEGE
McCOOK, NEBRASKA

SHELDON BRUMBAUGH
ARCHITECT

BUILDING CONSTRUCTION

COST: $29,000, or 24¢ per cubic foot.
WALLS: 13" brick.
FLOORS: First floor 6" concrete slab laid on the ground. Second floor concrete joist metal pans.
ROOF: Wood construction; 10-year composition roof.
COPING: Stone. Top of coping 10" above roof line.
WINDOWS: Fenestra architectural projected.
SHADES: Venetian.
INTERIOR DOORS: Flush veneer.
HEATING AND VENTILATING: Campbell air conditioning system. Iron Fireman stoker.
INTERIOR PARTITIONS: 2" x 4" studs; metal lath and plaster.
TRIM: Indiana limestone.
FACE BRICK: Smooth tan hydraulic face brick.
CEILINGS: 10' high.



Photograph by Luckhaus Studio

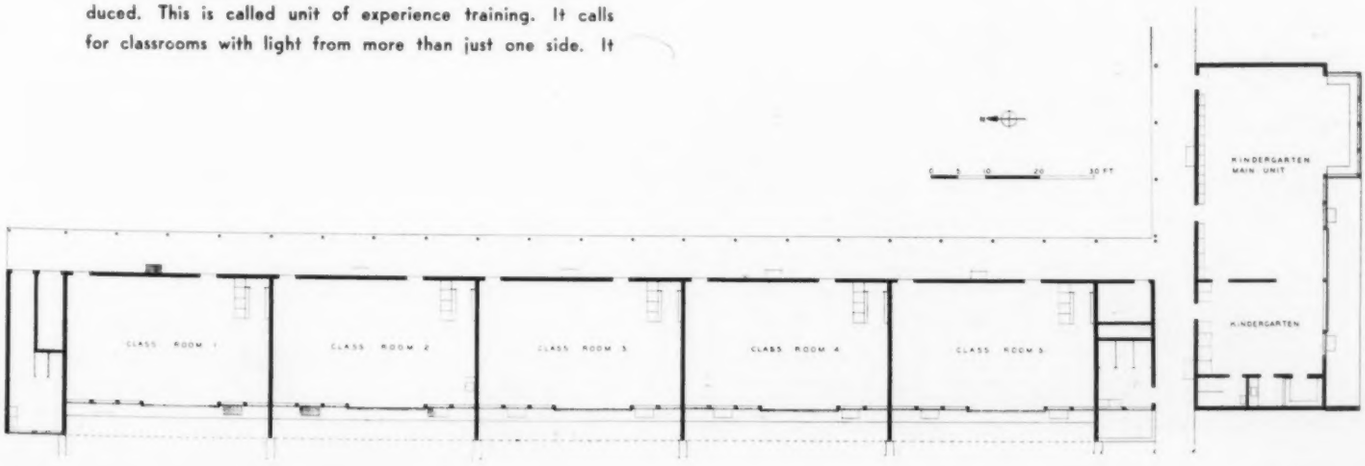
EXPERIMENTAL ELEMENTARY SCHOOL BELL, CALIFORNIA

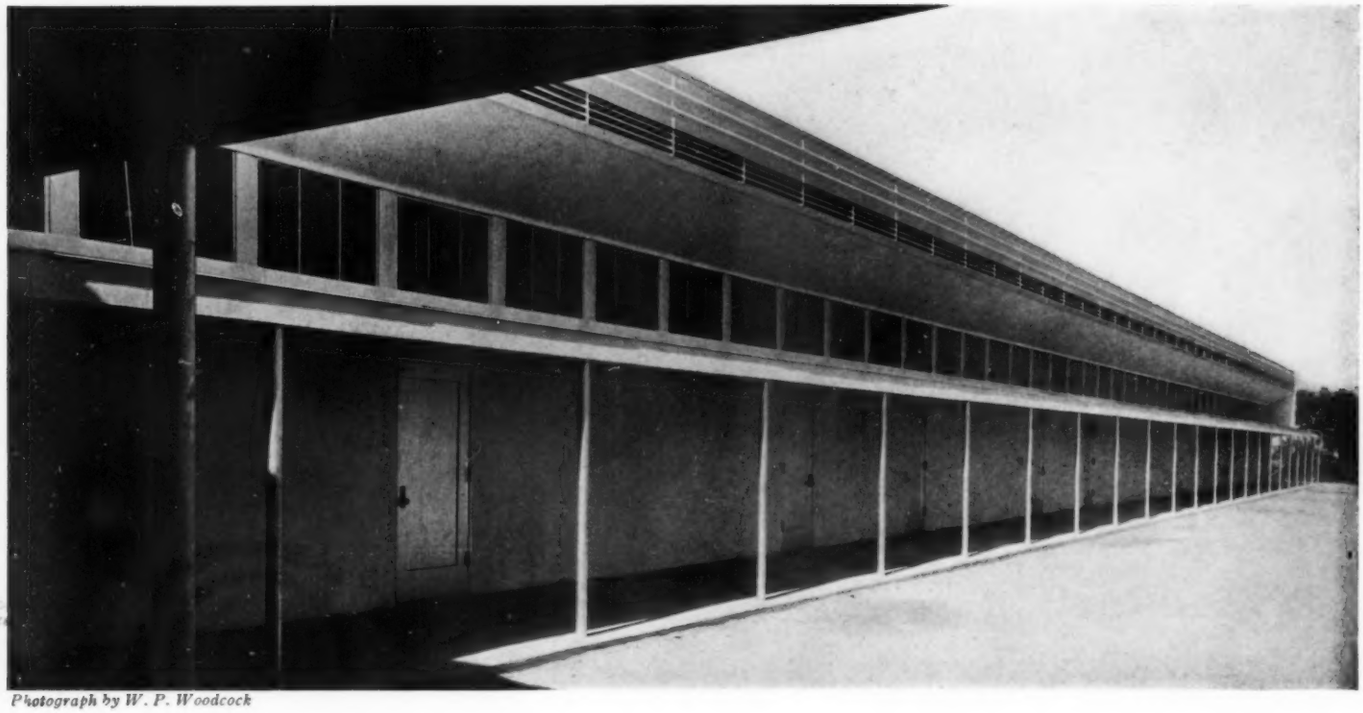
RICHARD J. NEUTRA, ARCHITECT

Richard J. Neutra has for many years studied the relation of the newer methods of education to the school plant. The old time listening school, where the three R's were taught in an academic way, could well get along with fixed seating arrangement and desks screwed to the floor. The teacher then faced the pupils and poured instruction into them. Now the teacher has become a member of an active group that freely works around in the classroom, constructs, builds, sews, dyes, handles all kinds of materials and tools as in the former manual training room, or performs in self-prepared costumes and in spontaneous dramatics. The academic subjects—reading, writing, arithmetics—are learned, while the children do their own research in illustrated books on the specific subject of activity, estimating the quantities of material used, writing reports on the work they have done, and preparing programs on the work they are going to do. The whole process holds the active interest of the children so that the problem of discipline becomes very much reduced. This is called unit of experience training. It calls for classrooms with light from more than just one side. It calls for material storage for small lumber, paints, clay, fabrics, for a sink with running water in each classroom, and so on.

Mr. Neutra studied the best public schools in most European countries and Japan as well as in the United States and tried to profit from these experiments. Eight years ago he developed the elaborate plans and ideas for the California Ringplan School; it was first published in his second book, "America, New Building in the World." The schoolhouse planning division in Sacramento became interested and the Los Angeles Board of Education felt sympathetic to the ideas incorporated there and commissioned Mr. Neutra to further research.

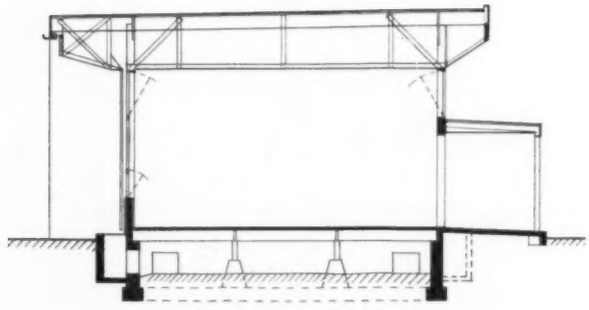
The experimental school plant at Bell, California, designed with the valuable cooperation of the experts of the Board's architectural division, is the fruit of all these studies from





Photograph by W. P. Woodcock

EXPERIMENTAL ELEMENTARY SCHOOL BELL, CALIFORNIA

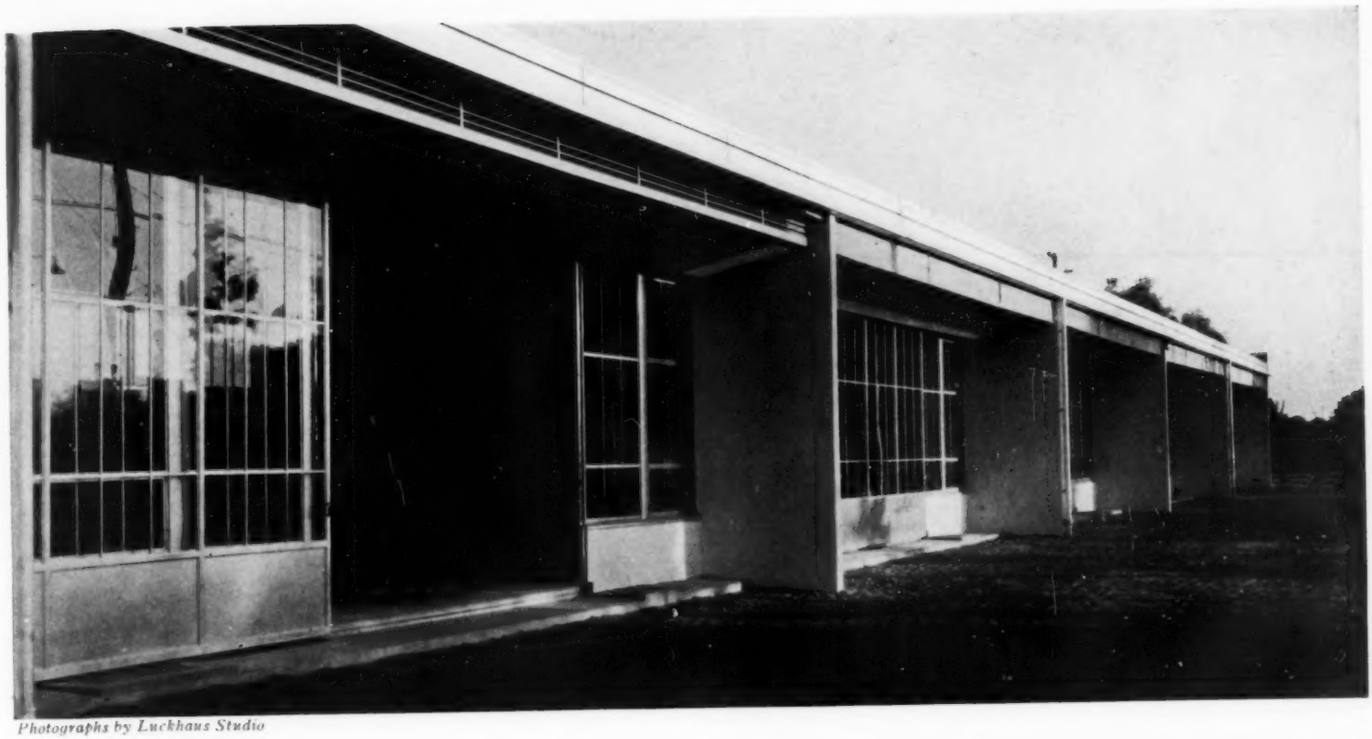


CROSS SECTION, SHOWING EARTHQUAKE-PROOF CONSTRUCTION



which other cities of the country may profit. As costs could not be determined comparatively concerning the more irregular ingredients of a school plant, Mr. Neutra chose one activity classroom of his design, reduced to what he thought its bare essentials. This classroom, 23 by 38 by 12 feet high, is entered by two 3-foot doors from the open air corridor on the east wall, and is equipped with a sliding glass partition giving broad access to the westerly patio, which forms an integral part of each classroom, doubling its instructional area. All glazing is steel sash and frames. Thorough cost elements were then made on constructing it in six different methods:

1. Reinforced concrete skeleton, hollow walls executed with sliding metal forms and rib floors poured on metal pans, acoustic Celotex ceiling. Optimum post distance: 12 feet 8 inches.
   Glass area: 56% of floor area.
   Ventable glass area: 17½% of floor area, not including doors.
   Cost per classroom: 116% of wood construction.
2. Concrete construction executed with air compression gun, without forms and with collapsible channel grillwork as furring (System Ruppel). Floor of reinforced concrete poured over hollow terra cotta tile. Thermax (Heraclith) roof sheathing by light steel trusses. Acousti Celotex ceiling. Optimum post distance: 12 feet 8 inches.
   Glass area: 56% of floor area.
   Ventable glass area: 16% of floor area, not including doors.
   Cost per classroom: 116% of wood construction.
3. Galvanized sheet steel skeleton floor and trussed roof construction. Acoustical ceiling of Pumicite plaster, wood roof sheathing and subfloor.



Photographs by Luckhaus Studio

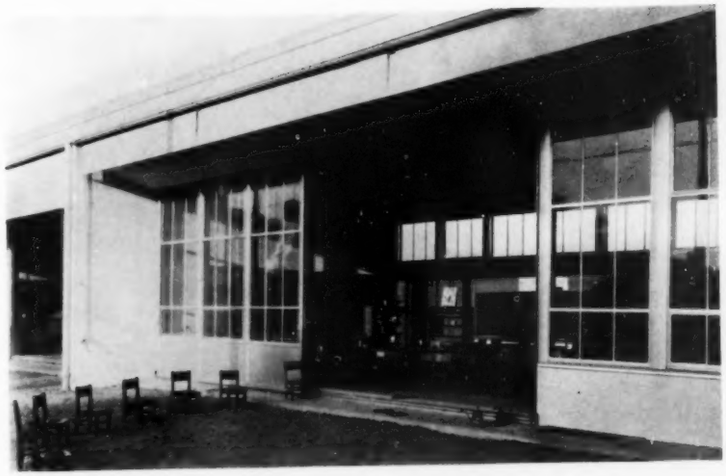
RICHARD J. NEUTRA, ARCHITECT

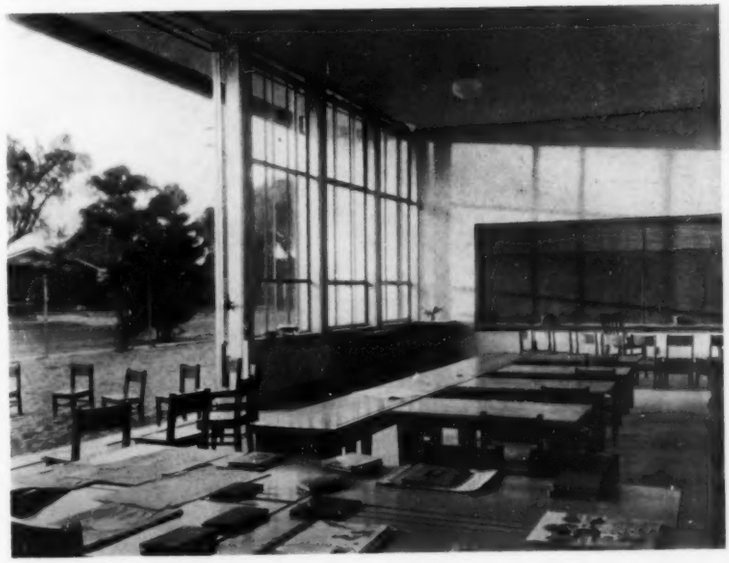
Optimum post distance: 4 feet 9 inches.
Glass area: 51% of floor area.
Ventable glass area: 15 2/3% of floor area, not including doors.
Cost per classroom: 114% of wood construction.

4. Walls, posts, roof, of Robertson corrugated sheet-steel elements, floor construction of prefabricated, vibrated reinforced concrete joists bearing subflooring. Acoustical ceiling of Absorbex.
Optimum post distance: 12-13 feet.
Glass area: 56% of floor area.
Ventable glass area: 17½% of floor area, not including doors.
Cost per classroom: 114% of wood construction.

5. Skeleton assembled of braced, rolled channel framing units, floors and roof of lightweight Robertson corrugated sheet-steel sections on rolled steel beams. Exterior and interior surfaces, expanded metal and cement. Acousti Celotex ceiling.
Optimum post distance: 7 feet 6 inches.
Glass area: 56% of floor area.
Ventable glass area: 17% of floor area, not including doors.
Cost per classroom: 118% of wood construction.

6. Standardized wood chassis with surfaced timber posts, floors borne by pressure infiltrated wood joists. Roof joists supported by continuous frontal trusses. Exterior and interior cement on metal lath. Continuous ventilation louvers for aeration of attic space.
Optimum post distance: 4 feet 9 inches.
Glass area: 51% of floor area.
Ventable glass area: 16% of floor area, not including doors.
Cost per classroom: 100% of wood construction.





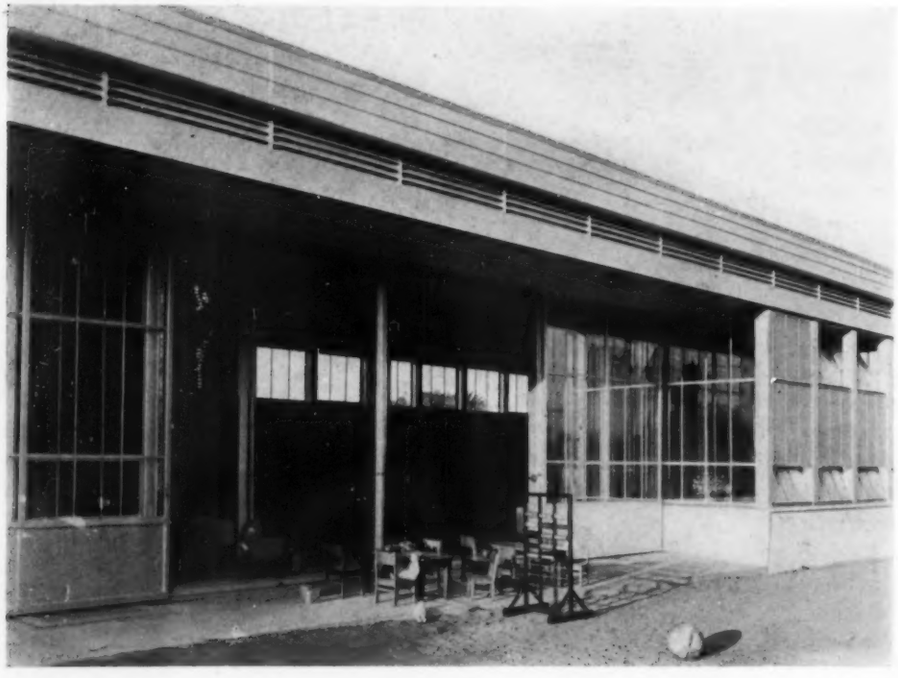


Photographs by Luckhaus Studio



EXPERIMENTAL ELEMENTARY SCHOOL
BELL, CALIFORNIA

RICHARD J. NEUTRA
ARCHITECT



Each classroom faces east and west, opens through a wide door into an outdoor classroom into which the pupils' activities can be extended. Inclosed corridors are eliminated. The kindergarten faces south and opens into the attached play patio. Roof overhangs, supplemented by vertical awnings, eliminate much of direct sun radiation, but permit an abundant influx of light.

HANOVER SCHOOL

SOUTH MERIDEN, CONN.

LORENZO HAMILTON, ARCHITECT

The perennial problem of securing the maximum amount of space for the minimum amount of money was solved in the Hanover School building by a strictly functional design.

The cost of the building proper was $61,228; equipment, $5,200; land, $4,500. The architect's and engineers' fees and a few incidentals brought the cost up to just under the original $75,000 appropriation. In addition, the local relief administration graded the grounds and built the concrete walks. The per-pupil cost (220 pupils) was $306, and the cost per cubic foot (242,425) was 25 cents. Throughout the designing and construction the board of education, the architect, and the superintendent had enthusiastic and valuable cooperation from a lay committee appointed by the parents and residents of the school district.

The building is of Class B construction, except for the roof, which has wood joists over the classrooms and plank over the auditorium. Walls, except for the painted brick in the auditorium, are plastered.



Photographs by Ben Schnall

GENERAL VIEW FROM REAR





Photographs by Ben Schnall

TYPICAL CLASSROOM

HANOVER SCHOOL

SOUTH MERIDEN, CONN.

Two objectives were constantly in mind while the building was being designed and equipped. The first was to furnish every facility possible under the appropriation for a progressive type of education; the second was to provide community service and recreation. The first objective is responsible for the four workshops between the classrooms, the linoleum floors and acoustical ceilings, the tables and chairs, and the unusual amount of bulletin-board space. Both objectives are served by the comparatively large auditorium-gymnasium, the special stage with its scenery door, the kitchen, and the extensive playgrounds. For the convenience of the public a library has been combined with the kindergarten (which has direct access to the outside), a special clinic has been installed for the use of the visiting nurses, and the auditorium has been given separate entrances from the street.

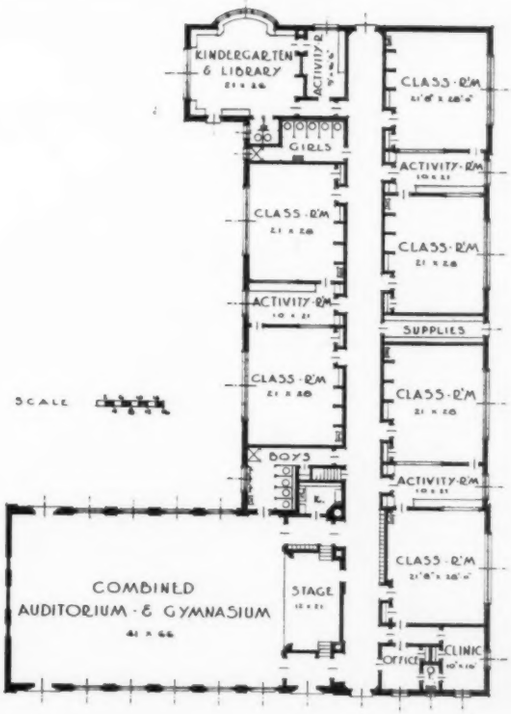
The process of education depends far more on pupils and teachers than on buildings and their facilities, but that the latter can contribute has been shown by the happy use which teachers and pupils alike have made of the workshops, the movable furniture, and the auditorium in the new school. Success is attested by the number of teachers from other school systems who have come and come again to see the school at work. The community features have undoubtedly served their purpose. The clinic is well patronized once each week. The auditorium-gymnasium has been used on an average of four nights a week since the opening of school, for community card parties, minstrel shows, basketball games, and other meetings. (Public dancing is not allowed partly because of the danger of making the floor too slippery for athletics, partly because of the difficulty of keeping out undesirable elements from other sections of the city and state.) The only charge made by the board of education for use of the building is $1.50 a night for janitorial service. It is noteworthy that in spite of constant use the building has suffered no material damage.



A WINDOW IN THE KINDERGARTEN

LORENZO HAMILTON, ARCHITECT

The steel sash used deserves mention; lower sections (or "hoppers") open in and make an effective substitute for the conventional glass deflectors sometimes used. Upper ventilators opening out give desired flexibility (with the "open window system") in all kinds of weather.



FLOOR PLAN



Photographs by Ben Schnall

YOUNG STUDENTS AT WORK

HANOVER SCHOOL

SOUTH MERIDEN, CONN.

Heating is by forced-circulation down-feed hot water. A steel boiler is fired by oil burners, adapted to number five oil. The system is zoned into three zones —classrooms, kindergarten-library, and auditorium—so that different temperatures may be maintained at night or on holidays when only one or two sections of the building are in use. Ventilation is by the "open-window" (gravity) system, with outlets through the built-in wardrobes. All of the radiators are wall type with shields. Supplementary unit heaters are employed in the kindergarten and auditorium.

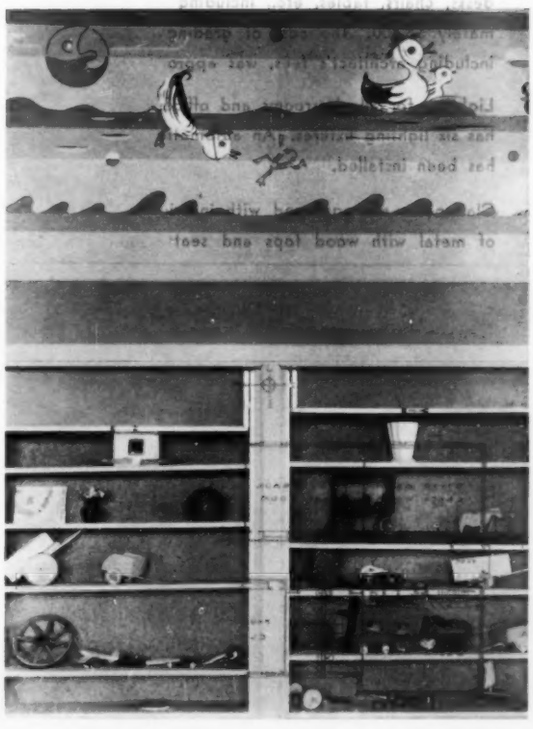
The School Board says: "If we were building over again, and had the money available, we should enlarge the kindergarten, install book shelves in all rooms, covered by bulletin boards like those in the kindergarten, and try to incorporate a fair-sized teachers' room. At present the teachers use the principal's office and clinic."



LIBRARY CORNER OF KINDERGARTEN

LORENZO HAMILTON, ARCHITECT

Above the chalk and bulletin boards each room has a frieze of washable wallpaper. The patterns are different and appropriate to the age level in each room, from the "crazy" duck, frog, and fish frieze on pale yellow, green, and rose strips in the kindergarten to a plain pattern in the eighth grade. The principal's office has wallpaper from floor to ceiling: a warm colonial yellow with blue figures. The woodwork in each room is colored to go with the wallpaper. The clinic is finished in white and gray paint. In the auditorium the brick walls are painted gray with maroon trim and the ceiling is acoustical Celotex of varying grayish brown natural shades; the window curtains are gray monk's cloth lined with maroon sateen; the stage curtains are a deep maroon velvet. This use of color has given each room individuality and the building as a whole real character.



MOVABLE BLACKBOARDS COVER THE SHELVES



GRADE SCHOOL
LAWRENCE, KANSAS

THOMAS LARRICK
ARCHITECT

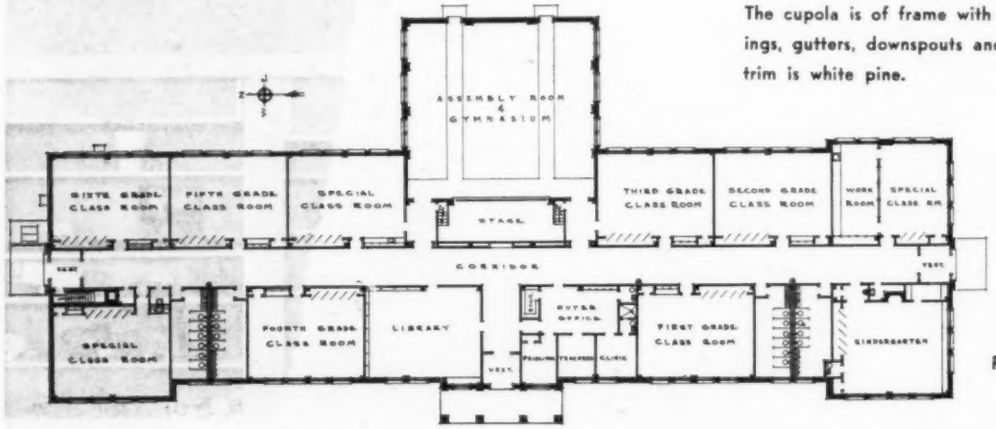
The building, a PWA project, contains approximately 379,500 cu. ft. and cost 23.8c per cu. ft. or about $90,000—including architect's fee and all fixed equipment. Cost of movable equipment such as desks, chairs, tables, etc., including architect's fees, was approximately $6,400. The cost of grading, sidewalks, and landscaping, including architect's fees, was approximately $6,150.

Lighting for all classrooms and offices is indirect. Each classroom has six lighting fixtures. An automatic clock and fire alarm system has been installed.

Classrooms are equipped with individual desks, tables and chairs of metal with wood tops and seats, and each classroom has a special reading table. All classrooms and special classrooms are equipped for 38 pupils with the exception of the small special classroom at the south of the building which is equipped for 20. The windows of the kindergarten and the special classroom at the south end of the building are of ultra-violet ray glass.

The building is constructed of reinforced concrete with the exception of the pitched roof which is wood framing built over a reinforced concrete ceiling slab. Spandrel beams were inverted making the heads of all windows even with the ceiling line.

Exterior walls are sanded colonial face brick and backed up with interlocking hollow tile. The pitched roof is asbestos shingles. The flat roof of the assembly room is tar and gravel on concrete deck. The cupola is of frame with copper roof and bronze finial. Flashings, gutters, downspouts and copings are of copper. All exterior trim is white pine.



FLOOR PLAN

MILTON JUNIOR HIGH SCHOOL — EAST MILTON, MASS.

RALPH HARRINGTON DOANE, ARCHITECT



Photograph by A. C. Haskell

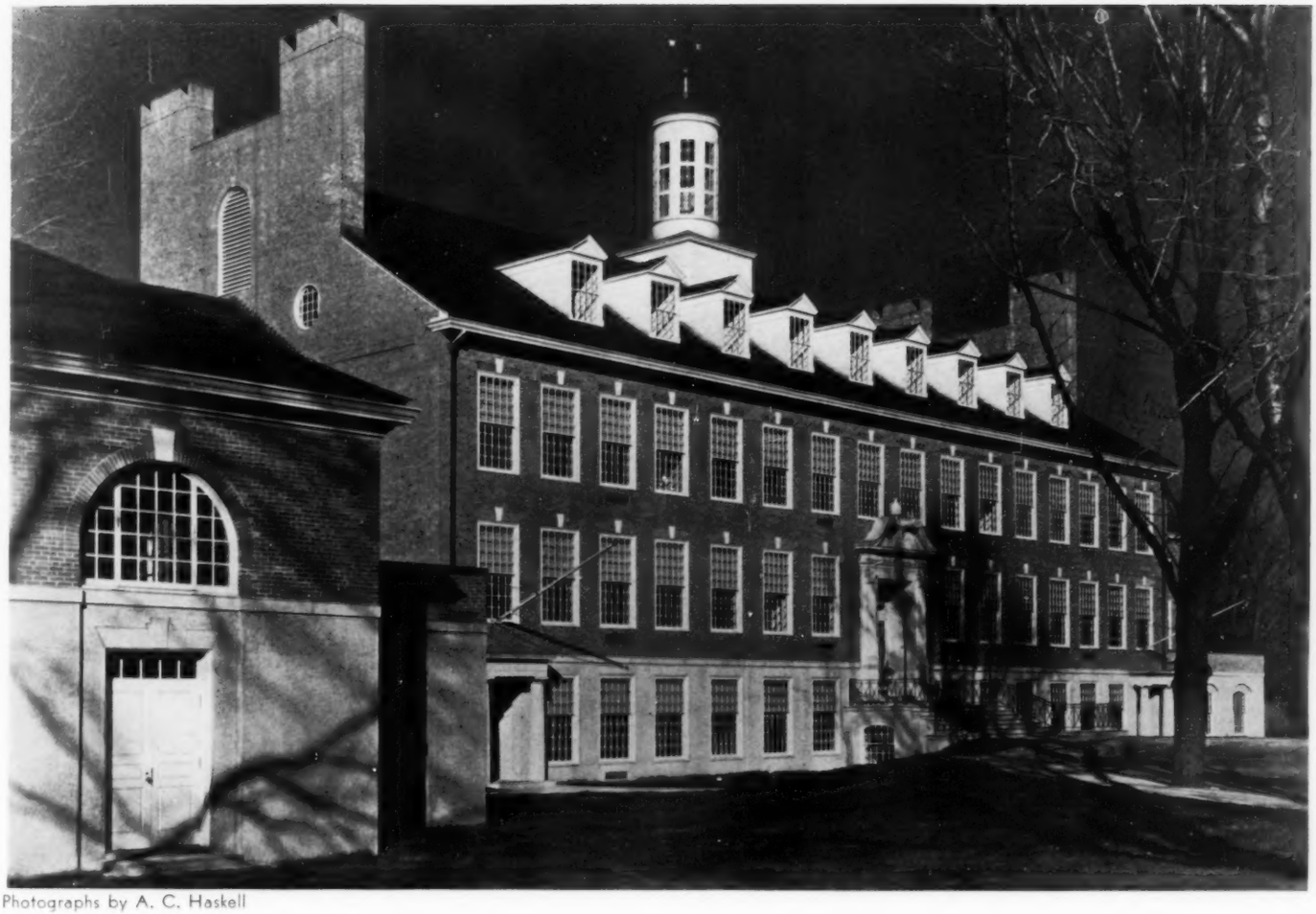


MILTON JUNIOR HIGH SCHOOL — EAST MILTON, MASSACHUSETTS

ONE OF THE STAIR HALLS

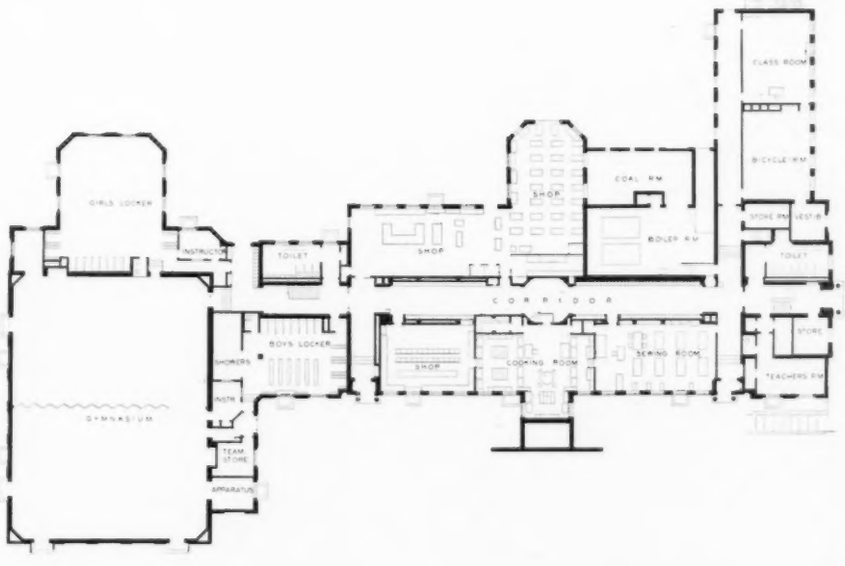


The school building is located on Edgehill Road, East Milton, adjoining the existing Collicot School, and opposite Cunningham Park. It is designed to accommodate six hundred pupils, and by the addition of classroom units at a later time the capacity can be raised to twelve hundred. The plans for the building provide, in the future, for the addition of such a classroom wing, as well as an auditorium. The main part of the building contains a basement and three stories, and is of fireproof construction with a wing to the rear two stories high. The following accommodations are provided: three shops, one cooking room, one sewing room, two science laboratories, one library, and thirteen classrooms. The gymnasium is divided into a boys' and a girls' section by a folding partition, with adjoining boys' and girls' locker and shower rooms. A cafeteria is located at the top of the building. Administration offices, teachers' rooms, storerooms, bicycle room, toilets, and a boiler plant are also provided.



Photographs by A. C. Haskell

RALPH HARRINGTON DOANE, ARCHITECT



FIRST FLOOR PLAN

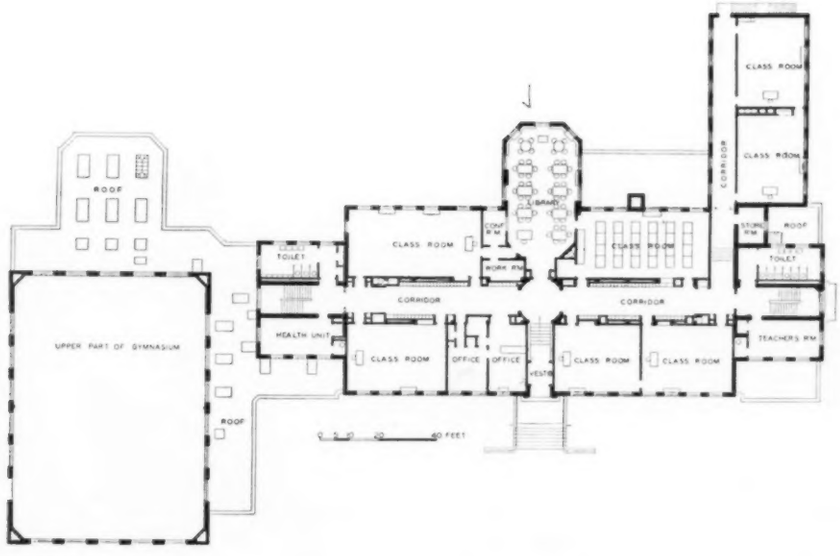


Photograph by A. C. Haskell

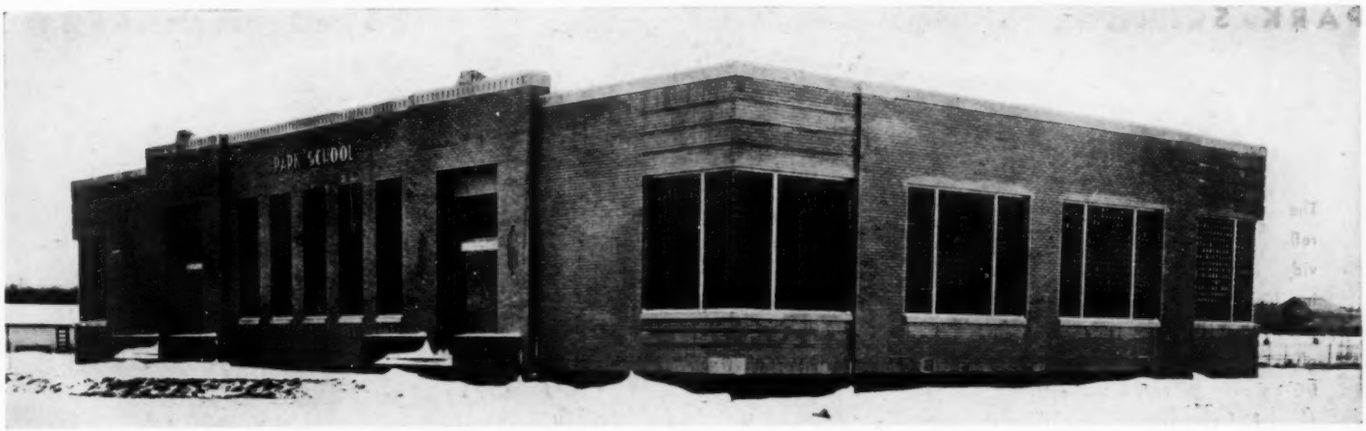
MILTON JUNIOR HIGH SCHOOL — EAST MILTON, MASSACHUSETTS

RALPH HARRINGTON DOANE

ARCHITECT



SECOND FLOOR PLAN



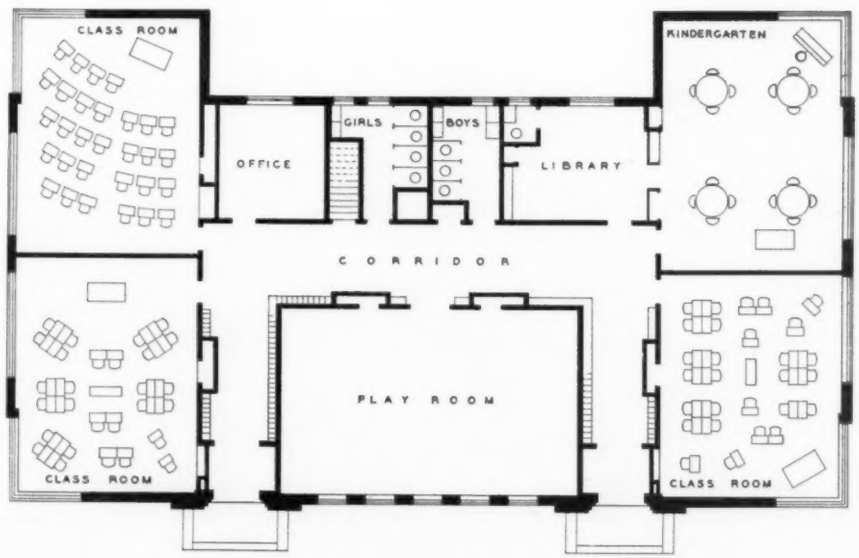
PARK SCHOOL — HIBBING, MINNESOTA

The new school has an appropriate setting in the southeast corner of a municipally-owned park. The lot contains about three acres which amply provide for a large playground in the rear. The front portion will be landscaped in a modern design, using such types of shrubbery as will best harmonize with the building.

Each classroom has more than twice the glass area ordinarily used in regular classrooms or required by state regulations. The east and west walls are practically all glass, continuing around the corners about 8 feet or a little more than 1/3 the width of the room. There are no movable windows in the building, as the air conditioning is designed to provide fresh air to each room throughout the day at a rate of 30 cubic feet per minute per pupil.

The glass-brick walls average a 65% vacuum which serves as an insulator to heat, cold, and sound, but they do not carry any structural loads. Cost of the completed structure was $33,000, or 26c per cu. ft.

J. C. TAYLOR
ARCHITECT



FLOOR PLAN

PARK SCHOOL

HIBBING, MINNESOTA

J. C. TAYLOR, ARCHITECT

The illumination is the semi-indirect, closed unit, prism type, with reflecting liners to reflect light upward and at the same time provide enough transmission to illuminate the lower bowl. All lighting fixtures in classrooms are automatically controlled with a photo-electric relay or eye which actually turns the lights on or off at certain stated foot-candle standards. The electric eye is set for an average of 15 foot-candle light intensity on a horizontal plane 30" above the floor. When the sun's illumination gets below this point, the lights are turned on, and if the sun's light should increase, by reason of cloud action, the lights will turn off. This feature insures proper illumination at all times. In the same way a heat thermostat provides a uniform heat.

The heating and ventilating equipment, located in the basement, is designed to recirculate from 75% to none of the foul air. This type of design takes anywhere from 25% to 100% outside air and delivers it to each room at any desired temperature. The heat in each room is controlled with an electric thermostat which can be set to any desired temperature. It is impossible to overheat from sun's rays or by occupancy because this type of system provides an absolute individual room control. All air passing into the system is filtered through removable filters; then humidity is automatically introduced to any desired saturation. The heat for the building is supplied from the municipal heating plant. The furnishings are the latest type modern design, arranged in informal groups and not in the conventional fixed straight lines.

FURNITURE IS MODERN, INFORMALLY ARRANGED





Photograph by Gottscho

COBURN COUNTRY DAY SCHOOL — MIAMI BEACH, FLORIDA

L. MURRAY DIXON
ARCHITECT

LOCATION: Water front lot on Normandy Isle, Biscayne Bay. The whole neighborhood is new, but already, since the school was finished, many houses and apartments surround it.

PURPOSE: This is a private school but as its activities are confined almost entirely to the winter months it was thought best to give it more or less a public school character. The cost budget was also an influence in this decision, for the building had to be erected on piles. A long, low, spread-out building which might seem to be the finest solution for a problem of this kind would be too expensive to erect. At first it was intended to do the building in the usual Mediterranean manner that is so prevalent in this vicinity, but by using a flat roof it was possible to add a great deal of classroom space at no additional cost. Part of this open space was covered over so that shelter could be taken from the quick squalls which occur here often.

MATERIAL: All material used in the building is according to local standards. Concrete block construction with reinforced concrete columns and tie-beams, light section steel sash, cypress millwork, and a 15-year bonded flat roof. Such items as the glass brick were used simply and solely for a structural and practical value. Although the school is not yet landscaped thoroughly it has already excited a great deal of comment as a clean-cut, common sense building.



Photographs by Gottscho

COBURN COUNTRY DAY SCHOOL — MIAMI BEACH,

Designed specifically for use as a country day school located in a moderate climate, the building fulfills its purpose. The majority of the pupils are seasonal, accompanying their parents south each winter. Most of these pupils come from schools in the north. They arrive at Miami Beach with outlines of work furnished by the home school, to be followed while they are getting their share of the southern sun. They find at Coburn Country Day School a type of instruction, in the hands of capable instructors working either individually or in extremely small groups, very similar in quality to that to which they are accustomed.

The school offers a conservative and straightforward instruction in all subjects making for a sound academic education and must naturally produce results or lose patronage. Although many northern schools give the school free rein regarding the pace of progress or method of instruction, in frequent instances allowing change of textbook as the most expedient means of reaching the desired goal in each subject, this is not always the case, and a highly diversified schedule for each instructor results. Therefore the need for a large faculty which, were the school's ledgers to be examined and salaries compared, would seem to be disproportion-

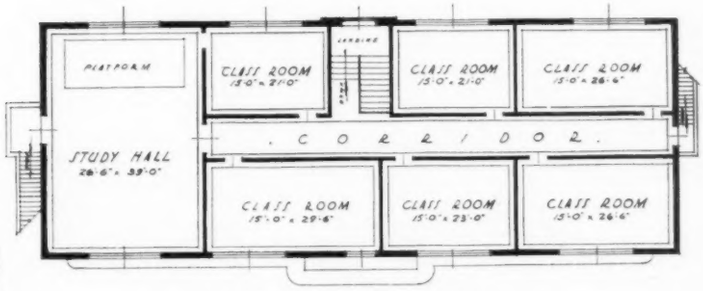


FLORIDA

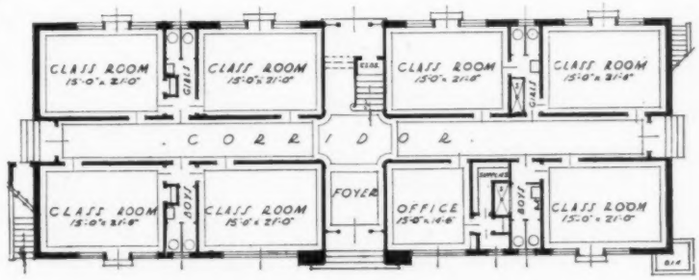
L. MURRAY DIXON, ARCHITECT

ately expensive. But a well-trained, experienced and numerous teaching staff is clearly essential in a school where skillful and thorough instruction is of paramount importance. Naturally, large classrooms are useless under these conditions where piece-work, and not mass production, is the order of the day.

The school offers a wide variety of athletics: horseback riding, sailing, baseball, basketball, touch football, archery, track, and cricket. In cultural pastimes, too, the school offers wide opportunity for expression, its auditorium being designed for all types of presentations. **NELSON COBURN**



. SECOND FLOOR PLAN



. FIRST FLOOR PLAN .



COMMUNITY SCHOOL

PICKWICK DAM, TENNESSEE

TENNESSEE VALLEY AUTHORITY

ARCHITECTS



The school at Pickwick Landing Camp is adapted to conditions somewhat different from those existing in the larger community at Norris. Although the Pickwick school building is of frame construction and of smaller capacity than the one at Norris, yet in each case the same relative attention was given to standards of comfort, sanitation, lighting, furnishings, and so on.

A feature of the Pickwick school is the fact that it was made an integral part of the community building. This makes it adaptable for use as a conventional school, as well as permitting its utilization for the spare-time training courses offered to workers on the dam. As a safety precaution, the school portion is separated from the main building by a brick firewall, with an automatic fire door guarding the single opening between the two buildings. Transoms in the corridor walls provide for thorough ventilation in the classrooms when required. Electrical space heaters are used for heating the school.



NORRIS SCHOOL **NORRIS, TENNESSEE**

TENNESSEE VALLEY AUTHORITY, ARCHITECTS

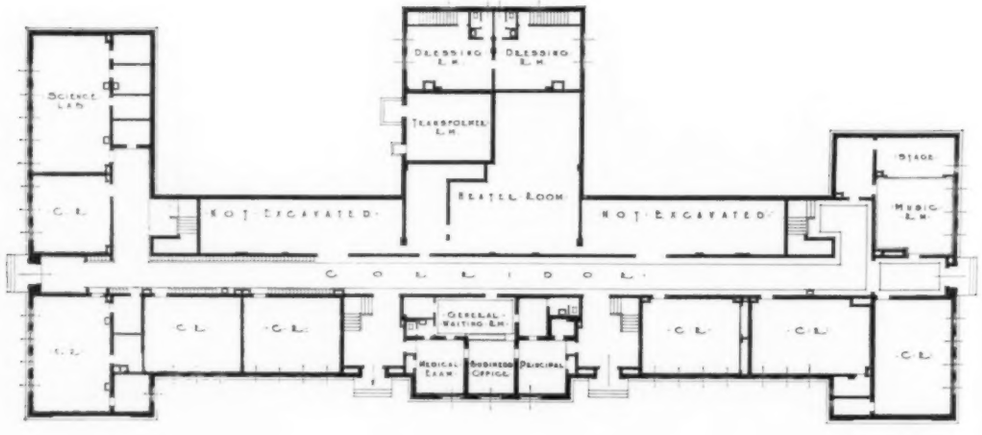


THE SCHOOL IS SURROUNDED BY PARKS

NORRIS SCHOOL

NORRIS,

The school at Norris is a semi-fireproof building—brick walls and metal roof—electric heat—classrooms for kindergarten, elementary, and high school—library, music room, auditorium-gymnasium with stage, science laboratory, and the like.



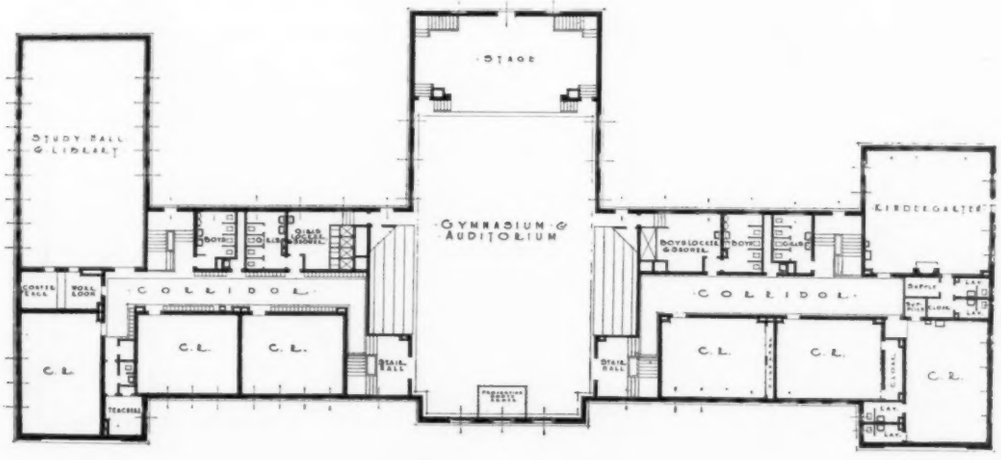
FIRST FLOOR PLAN



A PLAYGROUND AT THE REAR FOR SMALL CHILDREN

TENNESSEE

TENNESSEE VALLEY AUTHORITY, ARCHITECTS



SECOND FLOOR PLAN



THE LIBRARY IS ILLUMINATED FROM TWO SIDES

NORRIS SCHOOL

NORRIS,

The school at Norris is designed to serve both school and community needs. Provision was made for 150 high school students, including the seventh and eighth grades; 200 elementary school pupils, and 45 children in the kindergarten. The auditorium seats 580 and serves as both a link and a separation between the high school and the elementary grade school; it also serves for adult education. The administrative and medical offices located in the central bay of the first story are conveniently accessible from either within or without the building.

As the site is sloping, the Norris school is designed in two levels—two stories in front and one story in the rear. This results in providing the unique safety factor of direct exits to the ground from each floor level.

The wall construction, including the partitions between classrooms, is of brick. Except for ceilings, no interior plaster is used, the exposed wall surfaces being finished by painting directly on the brickwork. The ground floors are of concrete and the upper floors are of slow-burning construction with wooden joists protected by metal lath and plaster. Critical points, such as the transformer room, have ceiling slabs of reinforced concrete. Roof trusses are of steel, and roofing is of sheet metal painted to harmonize with the surroundings.

Separate toilet facilities are provided for each of the two departments, thus



THE GYMNASIUM IS COMPLETELY EQUIPPED

TENNESSEE

TENNESSEE VALLEY AUTHORITY, ARCHITECTS

segregating the age groups. In addition, individual toilet compartments open directly from the kindergarten and the first grade classrooms.

Extending beyond the rear of the school is the athletic field. Play space for the smaller children is reserved adjacent to the kindergarten.

The Norris school serves as a demonstration of the practical application of electrical heating to a building of comparatively large size. The main heating system is of the plenum type. The required amount of fresh air is drawn from a duct extending through the roof, humidified by means of an electrically generated steam-jet, and then, by means of a fan, blown through an electrical heating chamber consisting of a series of resistance coils. After passing through the warm air ducts leading to the various rooms throughout the building, a considerable portion of the partially cooled air is returned to the heating system and recirculated. As a sanitary precaution, however, the warm air for the toilets is dawn from the corridors and exhausted to the outside atmosphere by means of separate fans. To avoid complicating the system, some of the offices and minor rooms are heated by means of unit type electric radiators. The entire heating system is semi-automatic with thermostatic control, thus reducing personal attention to a minimum. The entire hot water supply for the building is also heated electrically by means of immersion type heaters in tanks or boilers.



NORRIS SCHOOL **NORRIS, TENNESSEE**

TENNESSEE VALLEY AUTHORITY
ARCHITECTS

JUNIOR HIGH SCHOOL

WEBSTER GROVES, MISSOURI

WILLIAM B. ITTNER, INC.
ARCHITECTS



TYPICAL CORRIDOR

GEORGIAN DESIGN TO CONFORM TO EARLIER BUILDINGS

Photographs by Charles Trefts



Photographs by George Tufts



1



2



3

1 GYMNASIUM 2 CHORAL ROOM 3 LITTLE THEATER

JUNIOR HIGH SCHOOL
WEBSTER GROVES, MISSOURI

WILLIAM B. ITTNER, INC.

ARCHITECTS

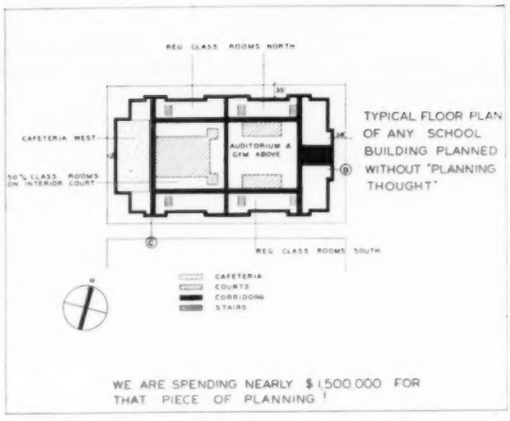
The new building is united to the Senior High School and properly correlated with its facilities.

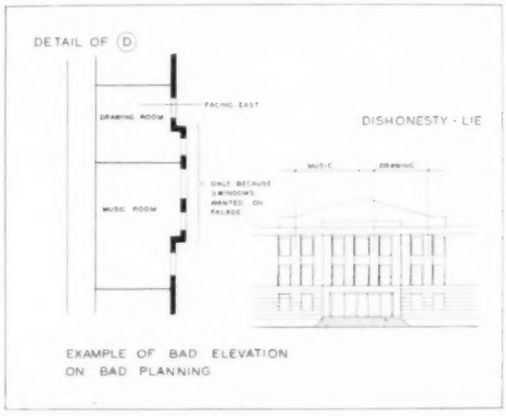
The new quarters, which will be used by the seniors as well as the juniors, comprise enlarged facilities for health education, domestic art, choral and instrumental music with practice rooms, and ample facilities for art and academic classrooms.

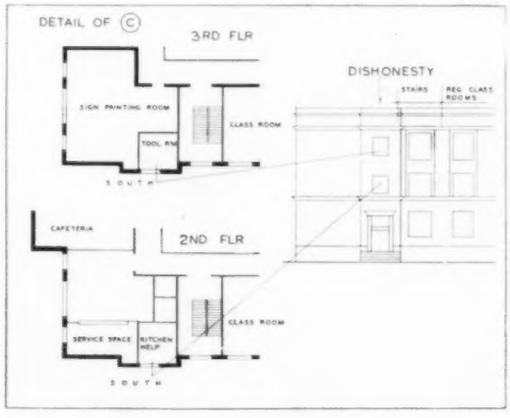
The building contains the following education units:

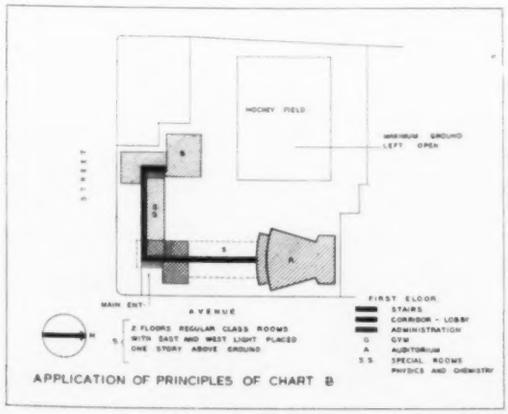
22 Classrooms.
2 Gymnasiums with locker and shower rooms.
4 Home economics with lecture room, reception room, dining room, and office.
1. Dramatic art room or little theater, 220 capacity, with stage and dressing rooms.
3 Music—
  1 Choral,
  1 Orchestra,
  1 Band and practice rooms.
2 Art rooms.
Necessary toilet rooms, storerooms, etc.
Pupils' lockers recessed in corridors.

A fire-resistive structure with a cubical contents of 1,059,000 cubic feet. Capacity: 1,000 students. Cost: $270,105, or 25½¢ per cubic foot.









THE FUNCTIONAL APPROACH TO SCHOOL PLANNING

By WILLIAM LESCAZE

"The functional concept of school architecture is paramount in school building planning." There can be no school planning worthy of the name unless the functions of the building are clearly understood, clearly expressed: and that understanding, expressing clearly the functions of a building, has been achieved by all good architecture in the past, and is what modern architecture is today attempting to achieve.

Buildings have an influence on us, on our outlook, our happiness. Walt Whitman said that there were trees which seemed to drop a blessing when he passed under them. Our buildings have the same effect: that is, they drop sometimes a blessing, and more often a curse. It has been calculated that the high school graduate spends about 13,000 hours within the walls of a public school building. Dr. Carr, Director of the Research Division of the National Education Association, states that "these 13,000 hours are potentially the most impressionable and valuable hours of the child's life." And, he adds, "quite apart from the normal educational processes, the physical school environment during these hours is bound to make a profound impression on the growing child." If buildings have an influence on us, should we not insist that our school buildings work well, and be good looking? Of course we should. But do they work well, and are they good looking? Alas, no! Most of the schools are massive, uninspiring, uninviting buildings. Pediments of limestone, a few columns and, when we can afford them, a tower or a cupola! It is always the same thing, with minor variations. Just as you may order lettuce salad with French dressing or mayonnaise, you may have a school building Gothic or Colonial!

Sacha Guitry, in his biography, wrote: "School ought to be a synonym for Paradise. The very idea of gathering children together in order to educate them and make social beings of them is a beautiful idea. Why, then, should all schools give off the atmosphere of prisons? The architects who put up such horrors should be punished." I think he should, in all fairness, have said the architects *and* the Boards of Education.

Quite recently the following announcement made the headlines of New York papers: " 'No more frills for school buildings,' says new Commissioner." This is good news. But it is only one step in the right direction. There is still much more to do. Much more than mere face lifting. It is a radically different approach to our school buildings which is needed. An honest, rational, up-to-date approach. Now let us ask this question: Can school buildings be designed so that they work and, at the same time, please and inspire? Most certainly, yes!

The only sound way to achieve this is through clear, lucid, honest thinking. That necessitates an effort. We must take the trouble to think. From thinking we get to planning. These processes of thinking, planning, are essentially what constitute good modern architecture. Since the word "modern" has been so often misused, I must hasten to say that by modern architecture I mean something which, with one exception near Los Angeles, we have not yet seen in our public school buildings. There is not at this moment one single, really modern, public school building in the United States!

Now, thinking and planning are a sort of exploration which must be carried out in at least six directions, if one wishes to build a good building (regardless of the kind—church, dwelling or school). (See Chart "B.")

I PROGRAM	Exact nature of the requirements: Kindergarten, Elementary, Junior High.
II SITE	Condition of site, topography level, sloping, orientation of points of compass, direction of prevailing winds, location of streets, adjoining buildings, playing facilities.
III FLOOR PLANS	Arrangement of activities inside the building, per kind of activities; administration unit, regular classrooms, special classrooms, cafeteria, gymnasium, auditorium.
IV FACADES	Outside of building—expression of inside—truth, honesty.
V MATERIALS	Choice, feeling, maintenance.
VI FINANCIAL SET-UP	Within budget—economy.

Why is it, if it is all as simple as this, that we have failed to function—as educators, or architects—during the last 50 to 70 years? It is not that we have been *physically* lazy. On the contrary! During the year 1930 we spent $400,000,000 on school buildings. This is a tidy sum to pay for the kind of buildings we got! The trouble is we have been *mentally* lazy: afraid to think; a bit embarrassed when we realized that our industrial development did not crystallize into the shapes of more Parthenons or Westminster Abbeys. Then we borrowed hastily from left and right to hide our embarrassment, to make believe that we, too, had that kind of civilization—instead of recognizing the true values of our own civilization and of being proud of them.

Most of us realize now that it is useless to deceive ourselves. Modern functions cannot be fitted into old forms, nor can twentieth-century "uses" be combined with twelfth-century "beauties"! The buildings of the past are beautiful not because they are a "style." They are beautiful because the men responsible for them devoted all their skill, their taste, their understanding, to fulfilling the purposes, the *functions,* of these buildings. In other words, these buildings grew out of the life of their time, to meet the requirements of their time. And that is exactly what our buildings must do: Grow out of the life of our time; meet the requirements of our time.

We must decide first what qualities modern education should develop. If they are to be truthfulness, courage, freedom, adaptability, intelligence—then we have automatically decided that what we require is the thinking, planning, functional method of building. We have decided for good modern architecture.

We owe it to ourselves, we owe it to our children, to our country, our civilization, to tackle at once the job of *readjusting* all building forms to the life of today, the needs of human beings living today. This is already being done in education; it must be done in educational architecture. To think and to plan clearly in the field of architecture means to build good, functionally working, aesthetically satisfying, stimulating, modern school buildings.

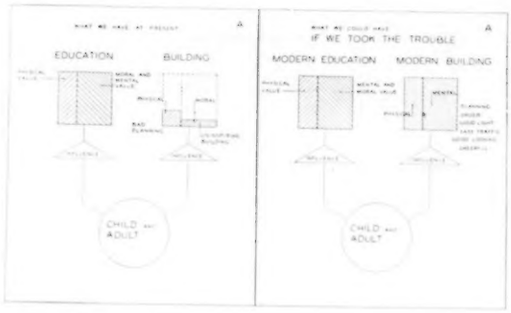


CHART A

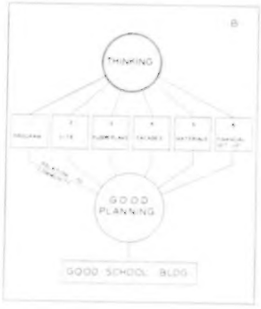
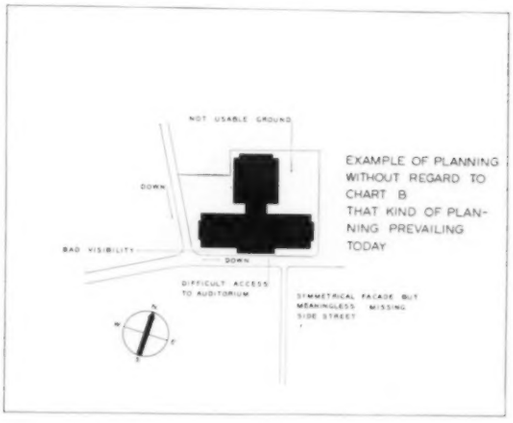
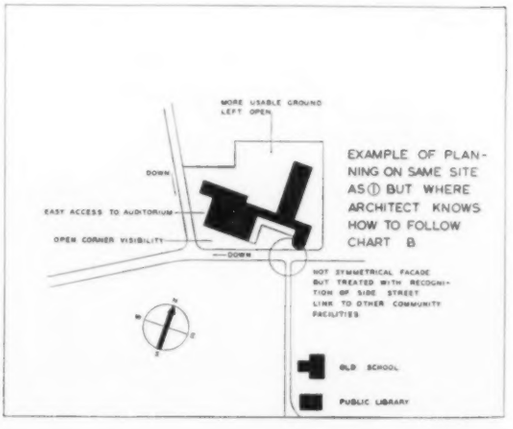


CHART B



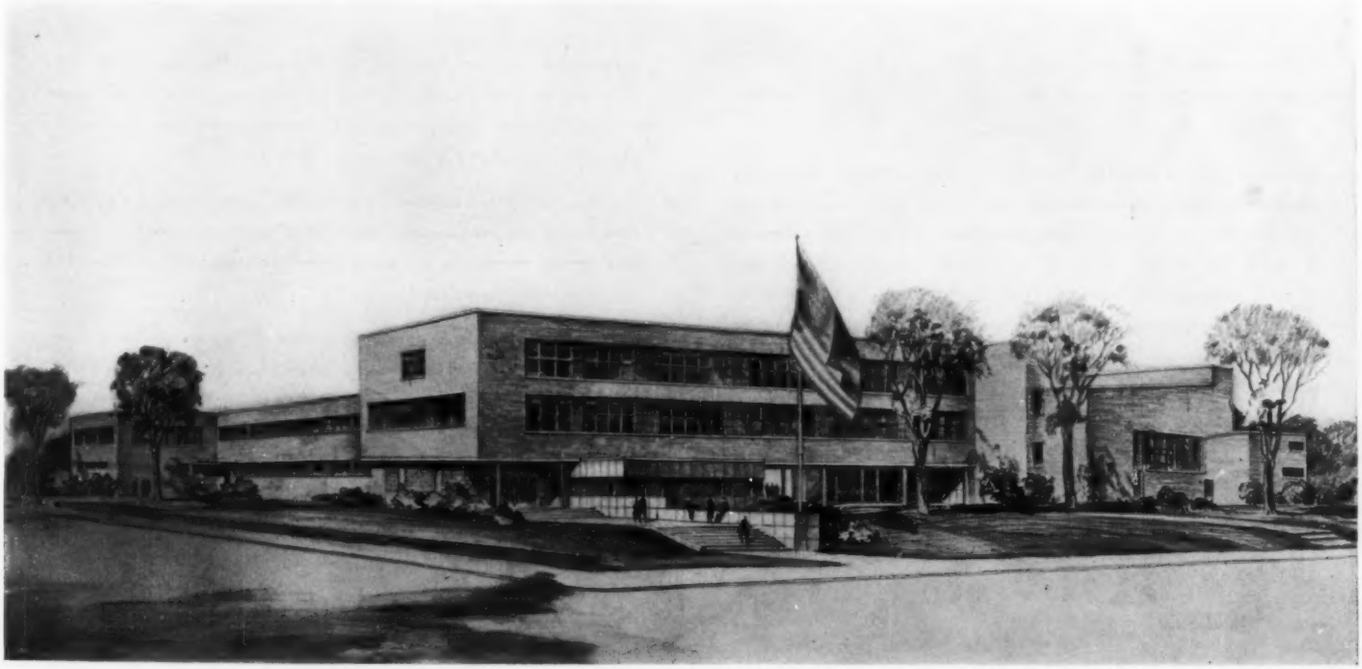


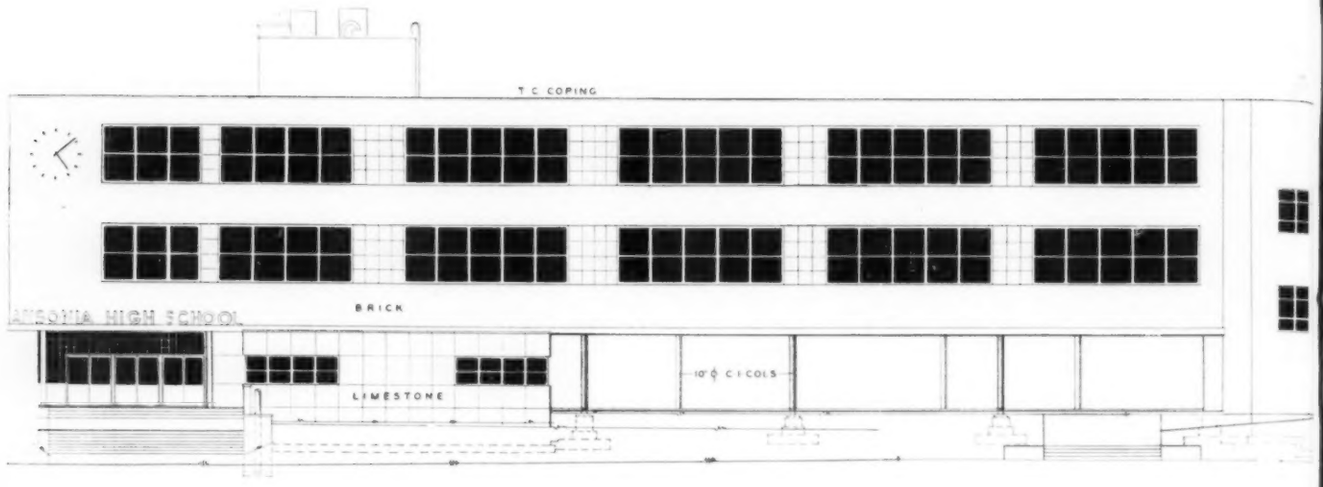
ANSONIA HIGH SCHOOL — ANSONIA, CONNECTICUT

WILLIAM LESCAZE, ARCHITECT
VERNON F. SEARS, ASSOCIATE

The disposition of areas was determined by the orientation and environment. The three major elements of the problem were auditorium, classrooms, and gymnasium. The auditorium was placed on the extreme north side of the property and as near to the main thoroughfare as possible in order to insure easy accessibility of the public, as the auditorium will also be used by other than educational groups. If the auditorium is used in the evening it will not be necessary to open the high school proper, thus insuring easy control. On the other hand, the students may quickly assemble in the auditorium upon call from

FROM THE SOUTHEAST





ENTRANCE ELEVATION

the classrooms. A stadium type of auditorium was designed to allow students to pass from the second floor corridor to the orchestra, via the stadium, if desired.

East-west light is the best for each of the ordinary classrooms. These rooms were placed on the second and third floors; on the first floor is the administration at the main high school entrance, it being the central point of all activity. An open porch was created between the administration unit and the auditorium to allow people passing the main thoroughfare an opportunity to see the open court and groups playing on the athletic field. This porch will also be used as the main entrance to all athletic events and to the gymnasium and the athletic field. The central location of the library on the second floor is advantageous for easy control of adult evening education.

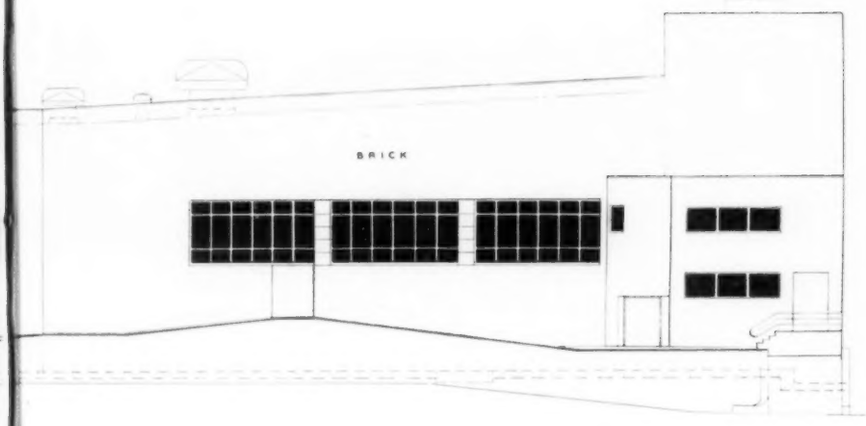
The east-west wing takes care of the special rooms, such as the laboratories and the commercial department, and these rooms are given north light as best for their purpose. The location of this wing on the site was decided upon in order to create as large an open court as possible, but still allowing ample room for future expansion on the south side of the corridor.

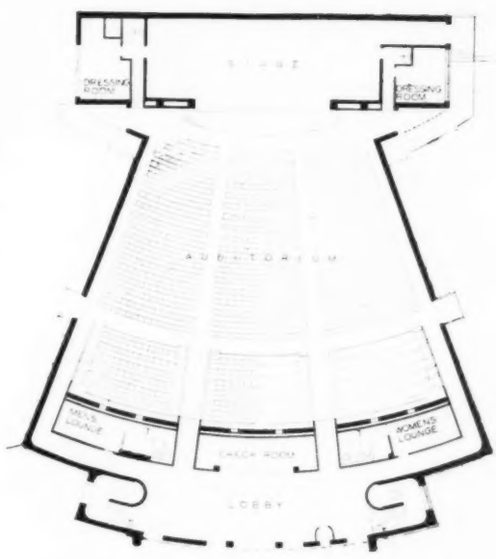
The location of the cafeteria was decided upon because the noise from this room overpowered the need of a central position; therefore it was placed as far away from the classrooms as possible, but still with convenient access.

The gymnasium unit is designed to relate the services as closely as possible to the activities. The physical director's office allows supervision of the activities in the gymnasium as well as on the athletic field. An entrance has been created for this unit to allow easy access from the shower rooms to the athletic field as well as being used as a private entrance for evening affairs held in the gymnasium. This relieves any need for opening of the high school proper.

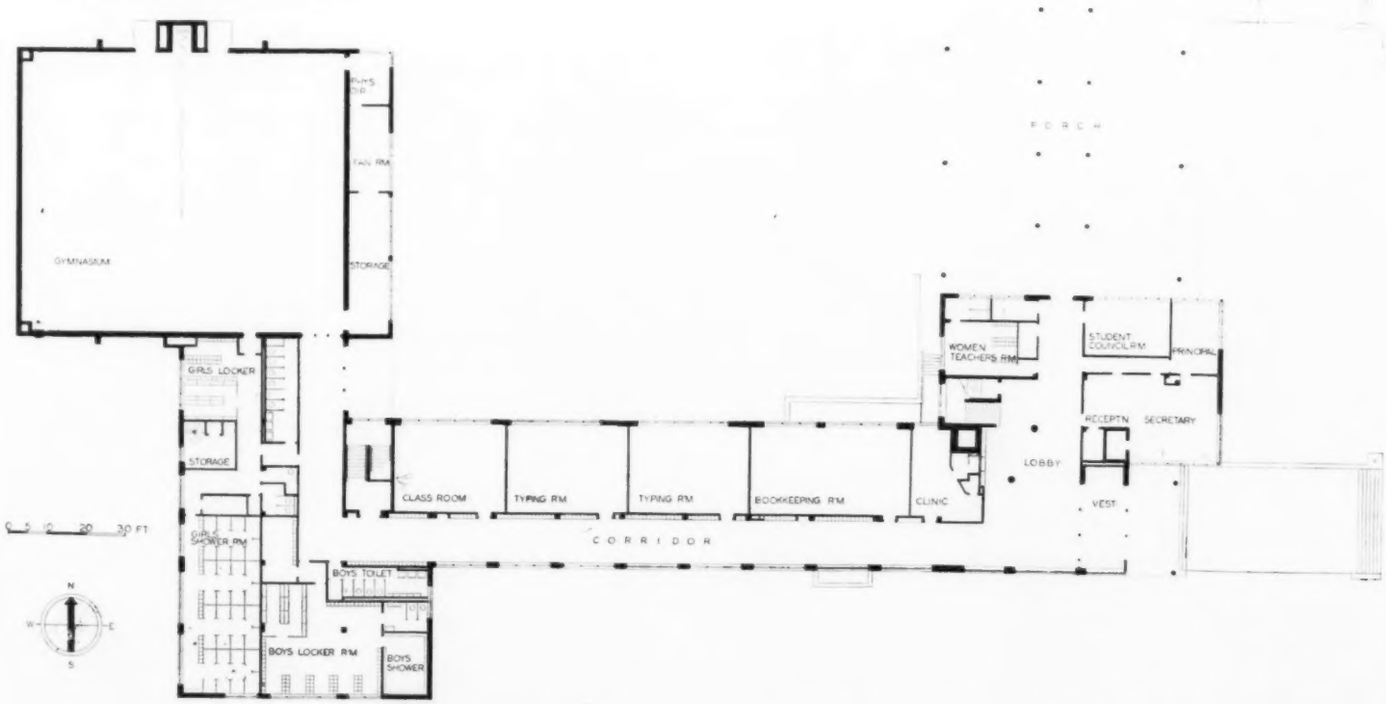
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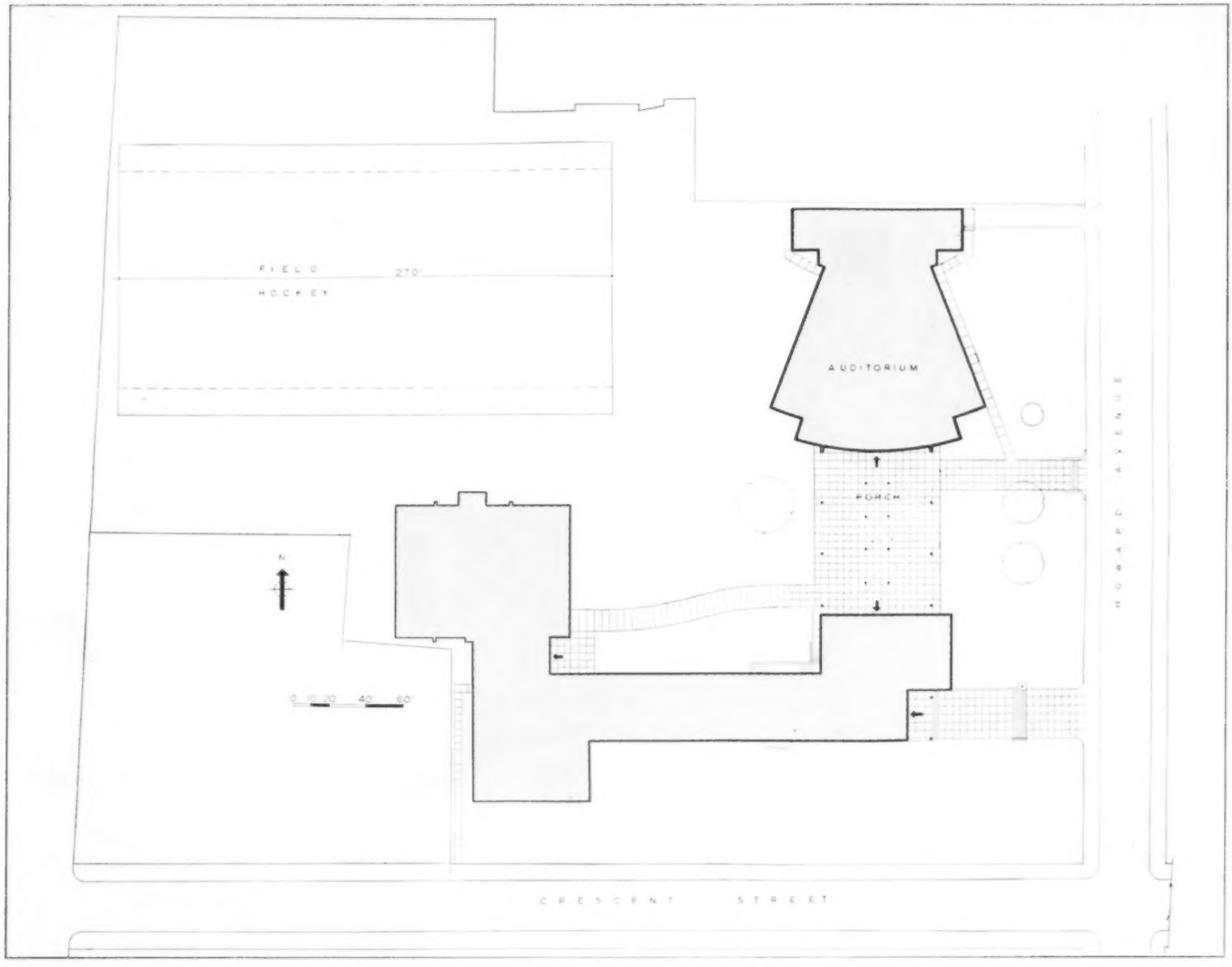
WILLIAM LESCAZE, ARCHITECT
VERNON F. SEARS, ASSOCIATE





FIRST FLOOR PLAN
showing separation of function





ANSONIA HIGH SCHOOL

ANSONIA, CONNECTICUT

WILLIAM LESCAZE, ARCHITECT
VERNON F. SEARS, ASSOCIATE

The finished plan is an interesting illustration of the architects' theories of planning. Notice how the plan reflects the clear definition between auditorium, classroom and gymnasium areas. The building shape likewise shows adaptability to the shape of the plot, without in any way sacrificing desirable orientation, relationships, and the like.

A MODERN BIBLIOGRAPHY OF SCHOOL DESIGN

ESPECIALLY COMPILED, WITH ANNOTATIONS, FOR THE ARCHITECTURAL RECORD

by **EARL F. SYKES, M.A.**

1. GENERAL
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3. SITE AND GROUNDS
4a. BUILDINGS: DESIGN AND CONSTRUCTION
4b. BUILDINGS: SPECIAL ROOMS
4c. BUILDINGS: DECORATION
4d. BUILDINGS: COSTS
5. EQUIPMENT
6. SPECIAL SCHOOL TYPES
7. BIBLIOGRAPHIES

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Here the underpass is depressed



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"Screening Schools Against Insects." pp. 51-53.
"Presenting Floor Plans to the Public." By Carter Alexander. pp. 56, 57.
"Planning Schools for a City Under 100,000." By E. W. Jones. pp. 57-59.
"Combining School Grounds, Playgrounds and Neighborhood Parks in Palos Verdes Estates, California." By Charles H. Cheney. pp. 139-142.
"The Evolution of a College Campus." By Henry E. Downer. pp. 145-149.
"The Landscape Architect, the Architect, and the School." By L. W. Briggs. pp. 150-52.
"Boys Gymnasium Locker and Shower Rooms." By Elmer J. Peery. pp. 173-176.
"Playground Plot Plans—Good and Not So Good." By George D. Butler. pp. 179-181.
"Planning Classrooms for Elementary Schools." By Raymond V. Long. pp. 207-210.
"The Administration of Visual Aids in Education." By John A. Hollinger. pp. 210-214.
"A Well-Integrated Public School Library." By Thomas R. Cole. pp. 214-216.
"Some Suggestions on Planning the Stage, Auditorium, and Equipment for a School Theater." By S. R. McCandless. pp. 217-221.
"Provisions for Musical Activities in New High Schools." By Norval L. Church. pp. 222-226.
"Equipment Needed for a High School Commercial Department." By Frederick G. Nichols. pp. 227-233.
"Arrangement and Equipment of School Cafeteria Kitchens." By Willard S. Ford. pp. 288-291.
"Space Allotments and Equipment for Home Economics Activities in High Schools." By Melvin Brodshaug. pp. 291-294.
"Student Residence Halls—New Model." By Harriett Hayes. pp. 295-297.
"New York State's New Home for Homemakers." The College of Home Economics at Cornell University. By Kathleen H. Small. pp. 297-301.
"Designing the Social Unit of a Modern High School." Cafeterias. By John Leonard Hamilton. pp. 302-306.
"The Science Building at Antioch College." By R. F. Eastman. pp. 322-327.
"The Broad Scope of Industrial Education in the Pasadena Junior High Schools." By George D. Henck. pp. 331-35.
"A New Science Building for a Boys Preparatory School." Exeter Academy. By Wilhelm Segerblom. pp. 336-39.
"Function of the Architect's Program." By Charles L. Wooldridge. pp. 340-343.
"The New Chemistry Building at Fisk University." By St. Elmo Brady. pp. 344-346.

National Council on School House Construction. Proceedings, 10th Annual Meeting. Milwaukee, Wisconsin. 1932
Including:
"How Shall We Go About Reducing Building Costs." By Andrew P. Hill. pp. 2-17.
"Economies in School House Planning Inaugurated in Chicago in 1932." By Thomas J. Higgins. pp. 38-42.
"The Effect of Wide Window Mullions on Natural Lighting." By L. W. Bishop. pp. 48-53.
"The Ventilation and Heating of School Buildings." By H. W. Smith. pp. 57-68.
"Room and Equipment Facilities for Science in The Small High School." By W. G. Eckles. pp. 75-88.

National Council on School House Construction. Proceedings, 11th Annual Meeting. Milwaukee, Wisconsin. 1933
Including:
"The Mutability of Standards in School House Planning and Construction." By R. H. F. Halsey. pp. 11-14.
"Report of Committee No. 1—Sites and Grounds." By Guy E. Wiley. pp. 14-19.
"Municipal Building Codes:—Their Influence Upon School Building Construction." pp. 20-19. By John W. Sahlstrom.
"School-Plant Requirements For Standardized Elementary and Accredited High Schools." By Haskell Pruett. pp. 33-40.
"What Effect Has the Horizontal Spacing of Classroom Windows on the Distribution of Light?" By Ray L. Hamon and Lloyd H. Taylor. pp. 40-44.
"Photo-Electric Relay Control of School Lighting." By T. W. Frostic pp. 45-51.
"Preferences as to Type of School Seating." By S. P. Clemons. pp. 51-55.

National Council on School House Construction. Proceedings, 12th Annual Meeting. Milwaukee, Wisconsin. 1934
Including:
"What Unit Should Be Used for Cost Comparisons of School Houses." By R. H. F. Halsey. pp. 18-23.
"The School Architect: Some Aspects of His Job." By H. W. Smith. pp. 23-27.
"The Development and Use of Planning Techniques For Small High Schools in New York State." By W. K. Wilson. pp. 27-44.
"The Activity Alcove Classroom." By John L. Donovan. pp. 55-60.
"Some Facts and Figures on School Construction." By A. G. Corbin. pp. 60-71.
"Guide For Planning of School Buildings." pp. 75-95.

A Method of Procedure and Checking Schedule for Planning School Buildings and Their Equipment. By John J. Donovan. Bruce Publishing Co., Milwaukee. 1932. 361 pp. $6.50
Provides a checking schedule and comprehensive outline of the many phases of planning school buildings and their equipment. Is valuable to school officials when outlining their problem to the architect, as a check list for preliminary drawings, working drawings, and specifications, and as an aid to the clerk of the works or building inspector during construction.

Standards for Elementary School Buildings. By G. D. Strayer & N. L. Engelhardt. Bureau of Publications, Teachers College, Columbia University. 1933. 181 pp.
A revision and enlargement of the earlier editions. These standards with the accompanying score card are indispensible in studying present school building facilities, and in checking the adequacy of plans for new buildings.

Score Card for Elementary School Buildings. By G. D. Strayer & N. L. Engelhardt. Bureau of Publications, Teachers College, Columbia University. 1933
A revised score card to accompany the revised "Standards for Elementary School Buildings," and an excellent device when used in conjunction with that volume.

The Planning and Construction of School Buildings. Thirty-third yearbook of the National Society for the Study of Education. N. L. Engelhardt, Chairman. Public School Publishing Co., Bloomington, Ill. 1934
A comprehensive study of the many phases of school building planning and construction; each phase being treated in a separate chapter by some leader in the educational field.

Planning School Building Programs. By N. L. Engelhardt and Fred Engelhardt. Bureau of Publications, Teachers College, Columbia University, New York. 1930. 570 pp. $5
A comprehensive treatment of all phases of school plant planning. Covers relationship of school planning to city planning, site selection, architectural service, costs, financing, publicity, etc.

Public Elementary School Plant. By Charles L. Spain, Arthur B. Moehlman, and Fred W. Frostic. Rand, McNally & Company, New York. 1930. 602 pp. $4
A discussion of the general principles underlying the educational designing of the public elemetary school plant together with practical technique to be utilized in the planning. Is well illustrated. Considers the traditional, the transitional, and the probable school of the future.

Public School Plant Program. By Arthur B. Moehlman. Rand, McNally & Co., New York. 1929. 405 pp. $3
Makes an authoritative presentation of the principles underlying the organization and administration of school plant programs. Sets up practical technique for evaluating present plant facilities and for determining ultimate school needs for a given school situation.

Report of the Survey of Schools of Chicago, Ill. Vol. IV. George D. Strayer, Director. Bureau of Publications, Teachers College, Columbia University. 1932. 315 pp. 75c
Presents an analysis of the schoolhousing situation in Chicago. The recommendations are applicable in some measure to every community.

School Architecture: Principles and Practices. By John J. Donovan and others. Macmillan Co., New York. 1921. 724 pp. $20
A very comprehensive treatment of the major phases of school building planning and construction, covering construction costs, departmental equipment, heating and ventilating, electrical installations, etc. Many excellent illustrations. Although the volume is not recent it still merits inclusion in any bibliography on school buildings.

School Building Management. By C. E. Reeves and H. S. Ganders. Bureau of Publications, Teachers College, Columbia University. 1928. 395 pp. $3.75
A comprehensive treatment of the field of school building management; can serve as an excellent manual on operation and maintenance of school plant.

School Building Problems. By George D. Strayer and N. L. Engelhardt. Bureau of Publications, Teachers College, Columbia University. 1927. 500 pp. $5.25
A collection of school building problems with which school officials are often faced. Covers many types of problems, population studies, selection of architects, location of sites, securing satisfactory plans and specifications, school-building contracts, equipping, and financing new school buildings.

School Building Programs in American Cities. By N. L. Engelhardt. Bureau of Publications, Teachers College, Columbia University. 1928. 560 pp. $5
Presents a selected group of school building programs in varying types of school situations. Furnishes a wealth of suggestive material, some of which is certain to apply to any immediate situation.

Standards for High School Buildings. By G. D. Strayer and N. L. Engelhardt. Bureau of Publications, Teachers College, Columbia University, New York. 1924. 95 pp. $1.05
Provides standards and a score card for ap-

praising present high school plans and for evaluating plans for new buildings.

Standards for Junior High School Buildings. By N. L. Engelhardt. Bureau of Publications, Teachers College, Columbia University, New York. 1932. 155 pp. $1.60

Indicates the influence of changing educational programs upon junior high school plant programs. Provides standards and score card for appraising present plant facilities and for evaluating new plant plans.

Survey Data Book and Standards for Operation and Maintenance of Physical Plant in Colleges and Universities. By N. L. Engelhardt, C. E. Reeves, and Parl West. Bureau of Publications, Teachers College, Columbia University, New York. 1935. In mimeographed form. 148 pp. $1

Provides means of checking efficiency of plant operation and maintenance. Can be utilized in training janitorial and maintenance staff.

Survey Field Book for the Analysis of a High School Building. By N. L. Engelhardt. Bureau of Publications, Teachers College, Columbia University, New York. 1931. 45 pp. 55c

An excellent aid in analyzing plans and in appraising existing high school plants.

The New World Architecture. By Sheldon Cheney. Longmans, Green & Co. New York. 1930. 404 pp. $10

A profusely illustrated volume devoted to modern architecture and building construction. Some school buildings are included. Presents an interpretation of modern design and makes comparisons of older types with the modern.

Sweet's Catalog File. Sweet's Catalog Service. Annual. 119 West 40th Street, New York City.

The most complete and convenient general reference in which to find manufacturers' descriptions of their products, including many manufacturers' specifications.

American School and University. American School Publishing Corporation, 470 Fourth Avenue, New York. Issued yearly since 1929. $2.50

These volumes constitute very comprehensive handbooks on recent school building planning and equipment. Contain articles of a wide variety, also plans and illustrations. Are devoted to the design, construction, equipment, utilization, and maintenance of educational buildings and grounds.

Report of Committee on The Location, Construction, Equipment, Maintenance, and Sanitation of the School Plant. N. L. Engelhardt, Chairman. White House Conference on Child Health and Protection. November 1929. Century Publishing Co.

Covers such topics as: Sites and playgrounds, schoolhousing standards pertinent to the health and welfare of school children, child health and protection through efficient operation of the school plants, the school plant in relation to health and protection of school children as portrayed in school building surveys throughout the United States.

Schoolhouse Planning and Construction. By Chas. A. Lee. Jefferson City, Mo. Botz Printing Company. 1933. 116 pp.

Contains a list of approved practices in school building construction, and detailed plans for various units of the school plant.

The Modern Trend in School Construction. By Reginald E. Marsh. American School and University. pp. 134-137. 1935

Points out some of the remarkable improvements which have taken place recently in schoolbuilding construction both in design and in practicability. Deals chiefly with wall construction, roof and floor construction, floor finish, wainscoting, acoustics, and color.

Getting a Fresh Viewpoint on School Planning. By H. Vandervoort Walsh. American School and University. 1935. pp. 47-52.

Presents several modernistic plans for school buildings, each having a number of unique features but all trying to make adaptations for changing requirements of education.

Planning the Consolidated School for Maximum Utilization. By W. K. Wilson. American School and University. 1936. pp. 31-37

Discusses the various factors affecting school building utilization, the ways of measuring such utilization, and how proper planning makes greater utilization possible. Gives plans of buildings which permit a maximum of utilization.

Approaching Changes in School-Plant Planning. By N. L. Engelhardt. American School and University. 1936. pp. 38, 39

Outlines changes in curriculum and in theory of administration which, together with the utilization of the school building for much broader community service, call for changes in school-plant planning.

Some Fundamentals of School Building Planning. By H. W. Schmidt. American School Board Journal. 92:17-19. January 1936

A good article on the topic named.

Planning the Central Rural School. By Don L. Essex. School Executives Magazine. 55: 6-9. September 1935. Illustrated

Describes the procedures to be followed in planning the housing for a central rural school including elementary and secondary years.

School Board, Architects and Superintendent. By Paul C. Stetson. School Executives Magazine. 55: 307-8. April 1936

Describes the various duties of school board, architects, and superintendent in planning new school buildings.

New England Plans a Modern School. By W. H. Kilham. School Executives Magazine. 55: 285-7. April 1936

Discusses some of the many problems encountered by small New England communities in planning a modern school.

Architect Defines His Service. By N. L. Engelhardt. School Executives Magazine. 53: 195-197, 248. March and April 1934

Analyzes the services which an architect might be expected to furnish when employed by a board of education.

Art in School Buildings and Grounds. By E. Sibley. New York State Education Magazine. 22: 347-351. February 1935. Illustrated

Points out many possible applications of art in planning and equipping school plants.

2. COMMUNITY AND SCHOOL

The School Plant in the Small Community Plan. By Leslie W. Nelson. School Executives Magazine. 54: 310-311. June 1935

Discusses essentials to be considered in locating and designing an educational plant which is also to serve as a community center.

Community and School Plant Planning. By N. L. Engelhardt. School Executives Magazine. 55: 46-48. October 1935

Coordination between planning the educational program and school plant and planning of the community as a whole is stressed as a necessity.

Function of the School Building in the Community. By N. L. Engelhardt. Teachers College Record. 35: 451-459. March 1934

Points out the necessity for coordination of school plant planning with community planning and how the school must be made the community center.

School Buildings as Efficient Laboratories for Coordinating Community Activities. By N. L. Engelhardt. Junior-Senior High School Clearing House. 9: 261-266. January 1935

Insists that school plant planning and community planning should be so coordinated that the schools will be made the "throbbing life centers" of the communities themselves.

Coordination of School Planning with City Planning. By Charles D. Anderson. American School Board Journal. 91: 81. November 1935

Stresses the importance of coordinating school planning with city planning. Presents a number of vital reasons for such coordination.

Bethany Community School. By E. B. Floyd. American School Board Journal. 91: 39-40. September 1935. Illustrated

A modern and rather unique treatment of the rural school which is to serve as a community center. Has four classrooms with connected work-rooms and a library. Small auditorium or recreation room in basement with adjoining play room and kitchen. Has small nurses' room with adjoining laboratory and shower.

Our Cities Today and Tomorrow. By T. K. Hubbard & H. V. Hubbard. Harvard University Press, Cambridge, Mass. 1929. 389 pp. $5

Although the book is chiefly concerned with city planning, it considers the schools from the standpoint of location and selection of sites, type and style of architecture, and utilization of the school playgrounds as community recreational centers.

The Location of City School Plants. By L. Leland Dudley. Harvard Bulletins in Education No. 14. Harvard University Press, Cambridge, Mass. 1929. 130 pp.

Provides sound criteria for selecting school sites, and techniques which assist in school plant planning.

The Relationship of City Planning to School Plant Planning. Bureau of Publications, Teachers College, Columbia University, New York. 1935

An excellent reference stressing the importance of proper coordination of city planning and school plant planning.

Educational Buildings: Their Relation to the Town Plant. By Wesley Dougill. The Town Planning Review, Vol. 16, pp. 1-15, July 1934

Develops idea of neighborhood units and cites illustrations in Nottingham and Wythenshawe, England.

A Community-Centered School. By Alice Thompson. Progressive Education. 9: 379-380. May 1932

Describes how, through community cooperation, the buildings were painted and the grounds landscaped at the Hessian Hills Schools.

The Community Activity Room. By H. G. Masters. Platoon School, 6: 3-8. September 1932

Describes the equipment and layout of a community activity room planned for the Pittsburgh schools.

Traffic Problems and Their Relationship to School Plant Development. By Burton W. Marsh. American School and University 1935. pp. 28-34

Analyzes traffic factors important in locating new school sites. Also suggests the facilities needed in schools to enable the teaching of vital safety and traffic knowledge and habits.

The Major Street Plan as It Affects the Location of School Buildings. By Harold M. Lewis. American School and University. 1935. pp. 34-37

Points out the factors involved in locating schools and the importance of neighborhood unit planning, with the schools an important part of the unit.

3. SITE AND GROUNDS

The Development of School Grounds. By R. C. Morrison. School Executives Magazine. 55: 125-127. December 1935
Describes and illustrates how Fort Worth, Texas, has remodeled and developed its school grounds.

A Plan for Planting. By Norman A. Morris. Nations Schools. 17: 50-53. January 1936. Illustrated
Discusses the planning of planting for various parts of the school grounds, also gives some consideration to planning the school grounds.

Landscaping Assumes a Major Rôle. By A. C. Stelling. School Executives Magazine. 13: 53-6. June 1934. Illustrated
Emphasizes the necessity for landscaping school grounds and gives a practical application of how this should be done.

Beautifying the School Grounds. By Carl F. Mack. School Executives Magazine. 54: 307. June 1935
Tells how it is possible to create a harmonious and advantageous effect by landscaping school sites.

Fencing the School Grounds. By S. Herbert Hare. School Executives Magazine. 55: 62-63. October 1935
A discussion of the various types of fencing suitable for use in developing school grounds.

Misfit Purchases of School Land. By John J. Donovan. School Executives Magazine. 55: 93. November 1935
Discusses ways of avoiding excess costs and waste in purchasing and planning school sites.

Selecting the School Site. By Fred Engelhardt. School Executives Magazine. 55: 12-14. September 1935
Discusses the many varied factors which must be considered in selecting school sites, with emphasis upon site selection in rural areas.

Planning the Planting of School Grounds. By L. H. Zach. School Executives Magazine. 55: 254-5. March 1936
An excellent article on the types and arrangements of plantings to use for different purposes and landscaping effects.

The Campus Development Program of Grove City College. By Weir C. Ketler. American School and University: Sixth Edition. 1933-34. pp. 150-152

The Development and Maintenance of Turf on School Grounds. By Howard B. Sprague. American School and University: Sixth Edition. 1933-34: pp. 153-156
An excellent treatment of the many problems involved in developing and maintaining turf on school grounds.

School Grounds—Their Planning and Planting. By R. B. Hull. American School and University: Sixth Edition. 1933-34. pp. 157-160
A comprehensive though brief treatment of the many factors involved in planning and planting school grounds.

Cultural Values of Landscaping Are Important to the Community. By Jens Jensen. Nation's Schools. 12: 16-20. August 1933. Illustrated
Stresses the cultural influence of beautiful natural school sites.

Landscape Assumes a Major Rôle. By A. C. Stelling. Nation's Schools. 13: 53-6. June 1934. Plans and Illustrations
Emphasizes the importance of planting and landscaping school grounds. Gives detailed plans for the landscaping of the Highlands Grade School, White Plains, New York, as an illustration.

The School Environment for the Four-Year Child. By Jane Bernhardt and Margaret Dawson. Childhood Education. 9: 248-52. February 1933
Suggests outdoor play equipment suitable for children of this age.

Selecting Building Sites. American School Board Journal. 85: 49. September 1932
Urges the purchasing of future school sites now.

The Selection of School Sites. By George W. Gerwig. American School Board Journal. 88: 13-15. January 1934. Illustrated
Emphasizes desirability of securing sites now for future school building programs. Shows examples of high cost of sites resulting from a lack of such a policy.

The Landscape Architect's Part in Planning Colleges and Schools. By Henry V. Hubbard and Leon Henry Zach. American School and University. 1935. pp. 155-160
Gives several illustrations of well-planned campuses, and outlines the factors which must be considered in such landscaping.

Surfacing School Play Areas. By William H. Bowles. American School and University. 1933-34. pp. 187-189
Discusses the desirable features of playground surfaces, such as permanence, drainage, texture, resilience, cleanliness, and appearance; and tells how these may be achieved.

Planning Public School Grounds to Meet Changing Needs. By S. Herbert Hare. American School and University. 1935. pp. 160-164
Treats such points as choice and improvement of sites, location of the school building on the tract, landscape construction, and planting.

The Care of Trees on School and College Grounds. By Martin L. Davey. American School and University. 1935. pp. 164-167
Discusses such phases as transplanting of large trees, insuring proper growing conditions, and eliminating the menace of weak and decayed trees.

Recreation and Play-Field Design for the Junior High School. By Willis Thomson. American School and University. 1935. pp. 186-188
Discusses the new recreation and activity program with the types of play-field design necessary to fulfill the needs of such a program.

The Proposed National Grandstand Code. By S. W. Homan. American School and University. 1935. p. 191
Presents the fundamental regulations proposed by the American Standards Association for construction of grandstands.

Space Requirements for the Children's Playground. American School and University. 1935. pp. 192-194
A summary of a comprehensive statement worked out by the National Recreation Association in consultation with the Recreation Division of the Russell Sage Foundation.

Landscape Development of the School Site. By Harold S. Bates and A. Carl Stelling. American School and University. 1936. pp. 170-176
Presents a very comprehensive list of standards and score card to be used in landscaping school sites.

Making Parks of the Fort Worth School Grounds. By R. C. Morrison. American School and University. 1936. pp. 177-181
Describes the school-ground landscaping project in Fort Worth, which is classed as one of the most outstanding in the whole country.

Annotated Bibliography on Landscape Development of the School Site. By Harold S. Bates and A. Carl Stelling. American School and University. p. 181
A brief bibliography on the topic named.

The University of Wisconsin Arboretum and Wild Life Refuge. By Franz A. Aust and G. William Longenecker. American School and University. 1936. pp. 182-184
Describes the purposes and the development of the arboreta at the University of Wisconsin.

Lawn Care. Issued by O. M. Scott & Sons Company, Marysville, Ohio
A small volume issued by the Scott's Seed Company, containing a great deal of information on lawn care. Includes a treatment of weeds and other pest control.

The Development of Outdoor Areas for Physical Education. By George E. Little and Clifton V. Barrett. American School and University. 1936. pp. 205-211
Describes the development of the campus at Rutgers University; sets up an ideal plan developing outdoor areas for physical education and recreation purposes, and then shows how this plan was adapted to the local conditions at Rutgers.

Cork-Surfaced Tennis Courts at Colgate University. By William A. Reid. American School and University. 1936. pp. 215-217
Discusses the cork-surfaced tennis courts at Colgate University and evaluates them as a possible solution of the tennis court surfacing problem.

Play Spaces for Small Children. By Helen L. Jewitt. American School and University. 1936. pp. 217-219
Urges the importance of providing such areas, the proper surfacing for them, and the selection of suitable equipment.

4a. BUILDINGS: DESIGN AND CONSTRUCTION

The Modern School Building. By W. W. Theisen. School Executives Magazine. 54: 172-173. February 1935
Presents problems facing school officials in selecting architects.

Trends in School Planning. By N. L. Engelhardt. School Executives Magazine. 54: 1702-105. December 1934
Sets up the criteria which must be considered in building the school of the future.

The Santa Monica School Reconstruction Program. By Laura Grace Crawford. American School Board Journal. 92: 36-37. March 1936. Illustrated
Describes the new activity-type schools developed in Santa Monica. The classroom units are very well planned for activity type of program.

"A Modern T. V. A. Electrically Heated School Building at Norris, Tennessee. By Ruth Peck McLeod. American School Board Journal. 92: 41-42. January 1936. Illustrated

Adapting the New High School Building to the New School Program. By Homer W. Anderson. American School Board Journal. 92: 23-24. January 1936
Points out trends in high school programs and what these imply in future school building planning.

Modernity in Building and Equipment. By C. A. Bowers. Nebraska Education Journal. 15: 109. March 1935
Cites trends in school program developments which call for changes in plant and equipment.

Adapting Old-World Architecture to New World Schools. By Frank A. Childs. School Executives Magazine. 55: 166-9. January 1936
Points out outstanding examples in United States of various types of old-world architecture being used for school buildings.

Planning the High School Building. By Homer

W. Anderson. School Executives Magazine. 55: 182-183. January 1936
Discusses trends in school programs and the influence these will have upon the number, size and types of classrooms.
The Architectural Forum. Volume 62: January 1935
Entire issue devoted to the design and construction of modern and future schools and to a review of outstanding foreign schools.
Symposium on Schools. Architectural Forum. 62: 17-20. January 1935
Schools of Tomorrow in the United States. By Arthur B. Moehlman. Architectural Forum. 62: 21-23. January 1935
New Elementary Schools for America. By Richard J. Neutra. Architectural Forum. 62: 25-35. January 1935
Suburban Elementary School. By W. Pope Barney and Roy W. Banwell. Architectural Forum. 62: 37-45. January 1935
A High School for the Community. By Wallace K. Harrison. Architectural Forum. 62: 56-63. January 1935
A Progressive Junior School. By Wm. Lescaze. Architectural Forum. 62: 46-55. January 1935
Europe Shelters Education. Architectural Forum. 62: 64-80. January 1935
New Techniques. By Richard J. Neutra. Architectural Forum. 62: 81-96. January 1935
The Architectural Record. Volume 76: August 1934
Includes a number of excellent articles and illustrations showing many modern American school buildings.
New Schools Are Needed. By C. Theodore Larson. Architectural Record. 76: 77-81. August 1934
Vocational Schools. By James O. Betelle. Architectural Record. 76: 82-88. August 1934
Portfolio of School Buildings. Architectural Record. 76: 89-112. August 1934
Modern Architecture for Public Schools. By W. Lescaze. School Executives Magazine. 55: 136-137. December 1935. Illustrated
Presents a strong plea for a modern architecture for schools, a functional and a more economical architecture. Presents illustrations and sketches of several modern schools.
Better Lighting in School Buildings. By Walter Sturrock. School Executives Magazine. 55: 97-99. November 1935
An excellent article on lighting in schoolrooms.
Plumbing Specifications for Schools. By Ernest T. Friton. School Executives Magazine. 55: 60-61. October 1935. Illustrated
Discusses some of the many plumbing essentials which must be considered in planning the new school.
Flexibility and Adaptability in Modern School Buildings. By H. W. Schmidt. American School and University: Sixth Edition. 1933-34. pp. 37-40
Stresses the importance of flexibility and adaptability and outlines the important details to consider in planning school buildings which are flexible and adaptable.
Local Character in College Architecture. By Herbert C. Wise. American School and University: Sixth Edition. 1933-34. pp. 33-36
Discusses and illustrates the use of various types of architecture in designing college buildings.
Desirable Physical Facilities for an Activity Program. By Frank M. Long. Bureau of Publications, Teachers College, Columbia University. 1933
Presents the results of a study of twenty progressive schools made to determine the physical facilities, buildings, equipment and grounds which should be provided for kindergarten and first six grades of elementary school.
Architectural Planning of the American College. By J. Frederick Larson and Archie M. Palmer. McGraw-Hill Book Co., N. Y. 1933. 181 pp. $2
A significant volume, covering college architecture, selection service and compensation of the architect, campus planning, details of spaces devoted to administration, class work, laboratories, dormitories, recreation. Is a product of the Association of American Colleges.
Some Code Controls of School Building Construction in American Cities. By John W. Sahlstrom. Bureau of Publications, Teachers College, Columbia University. 1933
A significant study of the effects of municipal building codes upon the construction of school buildings. Points out needed improvements in such codes.
Standards of School Lighting. The American Institute of Architects. 1932. 39 pp. 20c
A revision of the Code of Lighting School Buildings. Officially approved by the American Standards Association.
The College Library Building: Its Planning and Equipment. By James T. Gerould. Charles Scribner's Sons, New York. 1932. 116 pp. $2
An outline of standards and principles helpful in studying the needs preparatory to planning an effective and flexible college library building.
Types of Windows as Factors in the Ventilation of Classrooms. By John F. Ching. Library of University of California, Berkeley, Calif.
A mimeographed report of an experimental study of window ventilation.
An Architectural Advisory Service for Colleges. By Archie M. Palmer, American School and University: Sixth Edition. 1933-34. pp. 41-43
Describes the services offered to colleges by an architectural advisory bureau maintained by the Association of American Colleges.
Suggestions for the Standardization of School Architects' Working Drawings. By A. M. Proctor. American School and University: Sixth Edition. pp. 44-46
Points out that many obvious items are frequently omitted from drawings and suggests general standards which architects need to formulate.
Some Fire Hazards Frequently Overlooked in Public Schools. By T. Alfred Fleming. American School and University: Sixth Edition. 1933-34. pp. 47-50
Points out some fire hazards which may be prevented by proper school plant planning and others which can be corrected only by proper maintenance.
The Umberto Di Savoia Open-Air School, Milan, Italy. By N. L. Engelhardt. American School and University: Sixth Edition. 1933-34. pp. 50, 51
Outlines the many unique facilities provided and the educational program which utilizes these facilities to the maximum.
A New School for a New Age—the Snowflake Plan. By Herold Bradley. American School and University: Sixth Edition. 1933-34. pp. 55-58
The plan suggested has many unique features, devised to meet the needs of the activities-program and curriculum needs of the modern school.
New School Buildings in the City of Berlin. By Jens Nydahl. American School and University: Sixth Edition. 1933-34. pp. 59-61
Presents unique features of several of the modern German school plants, with illustrations of the plans of the buildings.
Safeguarding the School Board's Purchase of Architects' Working Drawings. By A. M. Proctor, Bureau of Publications, Teachers College, Columbia University. 1931. 138 pp. $2.10
An analysis of the inadequacies of laws and practices dealing with working drawings. A check list is developed which will aid school authorities in analyzing working drawings and in safeguarding their purchase of architectural service.
Check List Materials for Public School Building Specifications. By Lee Byrne. Bureau of Publications, Teachers College, Columbia University, New York. 1931. $2.35
Result of a scientific analysis of a large number of building specifications developed a check list of items which should be included in such documents.
College Architecture in America. By Charles Z. Klauder and Herbert C. Wise. Charles Scribner's Sons, New York. 1929. 301 pp. $5
Makes a study of representative types of architecture found upon college campuses in America. Discusses current theory and practice in college architecture, and the possible development of a distinctly American type of architecture adapted to climatic, environmental, and topographic conditions.
Construction et Aménagement des Ecoles Maternelles. By Mlle. S. Brès. Published by Delagrave, 15, Rue Soufflot, Paris. 44 pp.
Many illustrations and diagrams. Points out the unique features of the infant and nursery schools in France. A typewritten translation by W. M. Wallack can be secured.
Das Berliner Schulwesen. By Jens Nydahl. Wiegandt and Grieben, Berlin, Germany. 1928. 607 pp.
Contains many illustrations of school buildings and school activities of the modern type in Berlin. Shows how the school methods and curriculum have been facilitated by the new type of buildings.
Der Neue Schulbau. By Julius Vischer. Published by Julius Hoffman, Stuttgart, Germany. 1931. 102 pp.
The most outstanding book on modern European school buildings that is available. Covers all the European countries, and is profusely illustrated.
Ecoles. By Poulain Roger. Vincent Freal et Cie, 4 Rue des Beaux Arts, Paris, France
Contains many splendid illustrations, both exterior and interior, of modern French schools.
Edifici Scholastici Italiana, Primari E Secondari. By Luigi L. Secchi, Ulrico Hoepli, Milano. 1927. 228 pp.
A comprehensive treatment of the Italian schools, their architecture and their equipment. Many excellent illustrations.
Efficient Business Administration of Public Schools. By George F. Womrath. Bruce Publishing Co., Milwaukee, Wis. 1932. 461 pp.
Although a general work on school business administration, has excellent section on school building problems, location, construction, operation, maintenance, and equipment.
For Better Schoolhouses. By Fletcher B. Dresslar, S. L. Smith, Haskell Pruett, and others. Interstate School Building Service, George Peabody College, Nashville, Tenn. 1929
Composed chiefly of perspective sketches of school buildings, floor plans, school site arrangements, etc., together with suggestive specifications and contract forms. Treats various sizes and types of schools.
Grade School Buildings. By William Conrad and William George Bruce. 2 Volumes. Bruce Publishing Company, Milwaukee, Wis. 1925. 400 pp.
Is a compilation of selected articles and illustrations originally appearing in the

American School Board Journal. Presents the outstanding articles and illustrations up to date of publication.

High School Buildings and Grounds. Report of the Commission on Reorganization of Secondary Education. United States Bureau of Education. Bulletin, 1922, No. 23. 49 pp.
Gives a brief treatment of ventilation, lighting, safety, economy of construction, architectural beauty, and similar factors which pertain to all schools.

L'Architecture D'Audjourd'hui—Ecoles. Published by L'Architecture D'Aujourd'hui, 5 Rue Bartholdi, Boulogne-Sur-Seine, France. May 1934
An excellent compilation of illustrations of modern European school architecture and equipment, devoted chiefly to a series of varying types of French school buildings.

Measurement and Interpretation of School Building Utilization. By Edgar L. Morphet. Bureau of Publications, Teachers College, Columbia University. 1927. 102 pp. $1.60
Presents the results of a scientific analysis of school building utilization. Sets up criteria for measuring degree of utilization of each type of educational space.

Modern School Buildings, Elementary and Secondary. By Felix Clay. B. T. Batsford, Ltd., 94 High Holborn, London. 3d edition. 1929. 208 pp.
An excellent presentation of the English viewpoint and practice in school-building design and construction. Illustrations of outstanding English school buildings, both exterior and interior.

School Buildings of Today and Tomorrow. By W. K. Harrison, C. E. Dobbin, and R. W. Sexton. Architectural Book Publishing Company, Inc., New York. 1931. 233 pp. $16.50
An outstanding volume on school building design and construction. Traces evolution in school building design and suggests design of future school buildings. Many attractive illustrations.

School Ventilation—Principle and Practices. New York Commission on Ventilation. Bureau of Publications, Teachers College, Columbia University, New York. 1931. 73 pp. $1
This is a summary of the research financed by the Milbank Memorial Fund in the field of schoolhouse heating and ventilation. Points out that there is no justification for the extensive mechanical equipment found in such general practice and so frequently required by law.

Standards for the Administration Building of a School System. By George D. Strayer, N. L. Engelhardt, and W. S. Elsbree. Bureau of Publications, Teachers College, Columbia University. 1927
Includes suggested layouts for different sized school systems, and provides standards which are valuable in evaluating present and planned school administration buildings.

Architectural Concrete, Vol. I, No. 5. Portland Cement Company, Chicago, Ill. pp. 1-35. 1935
Entire issue devoted to articles and illustrations of modern school architecture, especially those of monolithic concrete construction. Splendid illustrations.

Public Elementary School, Los Angeles. By Richard Neutra. Architect and Building News, Vol. 154, November 22, 1935. pp. 226, 27
Presents plans and explanation of a modern elementary school in Los Angeles.

Housing the Modern Elementary School. By Royce S. Pitkin, Kenneth E. Oberholtzer, and George D. Strayer, Jr. School Executives Magazine. 52: 323-5. June 1933
Presents an analysis of twenty-one modern elementary school buildings in the United States.

Design and Construction of the Venice, California, High School. By J. C. Austin. Architectural Concrete, Vol. I, No. 6. pp. 8-11. 1935
Splendid illustrations showing the possibilities of monolithic concrete construction.

A Three-Year High School for 3,000 Pupils. Architecture, Vol. 72. November 1935. pp. 247, 248
Illustrations and plans for the new Wyandotte High School, Kansas City, Kansas.

Methods Used in Determining Room Size in High Schools. By G. E. Irons. Nation's Schools. 11: 43-8. January 1933. Plans, illustrations
Discusses techniques for determining room size.

Building Exits Code. Building Exits Code Committee. National Fire Protection Association, Boston. 1934. 92 pp.
Presents the building exits code, which specifies the number, size, and position of exit facilities.

Modern Practical Stairbuilding and Handrailing. By George Ellis. J. B. Lippincott Co. Philadelphia. 1932. 242 pp. Illustrated
Describes methods of construction and shows working drawings and diagrams of old and modern types of stairs.

New Day Elementary Schools. By John Hancock Callender. Architectural Forum. 59:479-86. December 1933
Discusses the architectural developments in elementary schools which are necessary to meet the needs of progressive education. Gives floor plans and equipment layouts for kindergarten, primary, and intermediate grade rooms and for various special rooms.

An Achievement in California School Architecture. American School Board Journal. 85:33-34. August 1932
The Williams Union Grammar School, Williams, California, functionally designed and in keeping with climatic and topographic conditions.

School Design and the New Architecture. American School Board Journal. 85:45. October 1932
Discusses the application of modernistic architecture to school buildings.

Three "Modern" Buildings—An Appraisal. By John W. Sahlstrom. American School Board Journal. 86:42-4. January 1933. Plans, illustrations
A critical description of the "Ring Plan" school and the Baulaus School at Dessau, Germany, and the Hessian Hills Private School, at Croton-on-Hudson, New York.

The Sloping vs. Flat Roof. Sheet Metal Worker. 24:319-20. October 1933. Illustrated
Emphasizes the merits of the sloping roof.

Functional Approach to the Design of School Buildings. By John Hancock Callender. American School and University. 1935. pp. 42, 43
Makes an analysis of the functional organization of the school and provides a functional chart showing such organization in graphic form.

Planning Windows for High School Buildings. By N. L. Engelhardt and W. L. Uhl. American School and University. 1935. pp. 44-46
Makes an analysis of sixty-four school buildings planned by thirty-eight different architects, showing the trend in window planning.

The Weequahic High School in Newark. By John H. Logan. American School and University. 1935. pp. 62-65
Picture and plans of the new modernistically designed high school in Newark, and a discussion of the type of program the school provides for.

Eye Protection in Every Classroom. By Olive Grace Henderson and Hugh Grant Rowell. American School and University. 1933-34. pp. 230-33
Explains the new code of Standards of School Lighting and points out the necessity of checking present school lighting facilities with these standards.

Structural Changes Which Modern Educational Ideas May Involve. By Ray L. Hamon. American School and University. 1935. pp. 38-41
Points out a number of the modern educational ideas which seem well established and which have considerable bearing on school plant planning. Suggests some structural changes which are involved.

Trends in Classroom Design and Equipment. By N. L. Engelhardt. American School and University. 1935. pp. 215-17
An excellent presentation of the trends in classroom design and equipment, gives illustrations for elementary and for high schools.

Light—The Connecting Link Between the Eye and Education. By Henry B. Dates. American School and University. 1935. pp. 224-226
A discussion of best artificial lighting practice for schoolrooms.

Beauty and Utility in Food Service: The Public School Cafeteria. By Mary De Garmo Bryan. American School and University. 1935. pp. 289-298
A comprehensive treatment of the many factors which must be considered in planning the public school cafeteria, such as location, size and shape of the room, lighting, ventilation, soundproofing and sounddeadening, walls, floors, furnishings, and equipment.

The New Home of the University of Cologne. By R. De Vau. American School and University. 1936. pp. 47, 48
Presents pictures of several of the new buildings at the University of Cologne and describes the main features of the new plant.

State Construction Codes for School Buildings. By Francis R. Scherer. American School and University. 1936. pp. 53, 54
Discusses the essential factors which should be covered by an adequate state school building code.

The Selection of Woods for School-Building Construction. By Bruce W. Angus. American School and University. 1936. pp. 57-59
Discusses the confusion caused by the present terms as applied to the grading of lumber, and suggests ways of selecting woods so as to insure the grade of lumber desired.

Raising the Standards of School Sanitation. By George L. W. Schulz. American School and University. 1936. pp. 144-147
Treats the relationship of sanitation and school building construction showing how proper construction automatically raises sanitation standards. Deals with such facts as flooring, wainscots, walls, ceilings, plumbing fixtures, ventilation, etc.

The Summer Renovation Program. By J. L. Gleason. American School and University. 1936. pp. 148-151
Outlines the many things which should be included in the summer renovation program.

The Housing of Schools for Young Children in European Countries. By Mary Dabney Davis. American School and University. 1936. pp. 237-244
Describes the major features of the school housing and equipment facilities for small children in the various European countries. A number of well-selected illustrations to point out unique features of the newer schools in the various countries.

Designing the Classroom in Terms of the Activity Program. By Edwin W. Broome. American School and University. 1936. pp. 252-55
Presents sketches and pictures of a classroom designed to better meet the needs of the activity program. Has a number of unique features.

Modern Architectural Approach is Logical in School Construction. By W. P. Barney. Nation's Schools. 15:41-5. March 1935
Tells how such an approach permits the use of new materials, economy in construction, a new architectural beauty, and adaptation to educational needs.

Implications of Progressive Education for School Plant and Equipment. By H. H. Davis. American School Board Journal. 89:25-6. July 1934
Outlines the type of educational program the progressive school offers and explains the implications for future school plants and equipment.

Designed to Meet the Children's Needs. By H. L. Smith. Nation's Schools. 16:44-7. November 1935. Illustrated
Describes how the new elementary building at Teaneck, New Jersey, was designed and built to meet the children's needs.

Building Schools for the Nation. By C. Theodore Larson, Technical News Editor, The Architectural Record. (In National Association of Public School Business Officials. Proceedings, 1934.) pp. 149-58
Points out that school architecture is not so much a matter of externals but rather a matter of internals, making a distinction between monumental architecture and instrumental architecture. Also points out many of the recent and probable future developments in school plan design and construction.

Planning and Building Schools in the Smaller Districts. By N. L. Englehardt. School Executives Magazine. 52:355-7. July 1933. (Same condensed in School Management. 2:8-9. September 1933.) Plans
An excellent article on the various phases of the problems involved in planning and building schools for the smaller districts.

Professional Advice Expected by the School Architect from the School Administrator. By C. O. Thompson. Elementary School Journal. 33:690-7. May 1933
Points out that planning and construction of a school building is a cooperative enterprise in which the services of several types of highly trained specialists are needed.

Functionally Designed Building Aids Progressive School. By L. Hamilton and N. Moseley. American School Board Journal. 91:33-5. August 1935. Illustrated
A seven-classroom unit, with connected workrooms, office, nurses' room, kitchen and combined auditorium and gymnasium. Has several unique features, the major one being the functionally designed architecture.

Modern Design for School Buildings. By A. C. Guth. American School Board Journal. 88:44. January 1934
Forcefully presents the necessity for modern design for school buildings. Emphasizes that architects must cease to rehash the models of the past, and should develop a modern style of architecture, more economical and suited to the needs of the institution.

Our School Architecture of Tomorrow. By W. B. Ittner. American School Board Journal. 87:40. August 1933
Presents the need for a new school architecture in a forceful manner, showing that the change will call for a revolutionized building plan evolved to meet the needs of an enlarged and reorganized educational program; and that new building forms, use of new materials and new design must come.

Trends in School Building Construction. By Elwyn E. Seelye. American School Board Journal. 88:35-36. January 1934
Presents several types of economies in school building construction, such as the use of ceilings of rubbed concrete rather than plaster.

School Architecture That Will Live. By E. Sibley. American School Board Journal. 90:15-16. January 1935. Illustrated
Brings out the fallacy that beauty and economy are incompatible. More attention must be given to the architecture of the interiors; new uses of materials, soundproofing, etc., must be developed.

Ramps Versus Stairs for School Buildings. By Wm. H. Weeks. American School Board Journal. 90:38-39. May 1935
Points out the merits of the ramps and compares costs.

Novel Trends in School Building. By R. A. Getter and R. B. Warren. School Executives Magazine. 54:123. December 1934
Proposes that the modern idea in school building design is to combine educational necessity with architectural accomplishment. Critically reviews the major features of the modern European school architecture.

Built for Tomorrow's Needs. By E. P. Tooker. Nation's Schools. 16:44-7. October 1935. Illustrated
Depicts how a rather small school was planned and built to fill the needs of both a modern school and a community center.

Schools of Tomorrow. By F. L. Devereux. (In National Association of Public School Business Officials. Proceedings, 1934. pp. 36-41); Same in Journal of Business Education. 10:17-19. October 1934. Excerpts. Ed. Screen. 13:182. September 1934; Pennsylvania School Journal. 83:75-6. October 1934
Outlines the many developments which will take place in school plant planning, construction, and equipment.

One Hundred Years of School Building in Chicago. By D. C. Rogers. Chicago School Journal. 15:74-83. January 1933. Plans, illustrations
Presents plans of World's Fair Elementary School which has some unique features.

Rehabilitation of School Buildings. By John A. Sexton. School Executives Magazine. 55:128-130. December 1935. Illustrated
Tells how Pasadena has rebuilt her schools to conform to new standards of safety.

Brockport Central High School. By H. B. Dryer. American School Board Journal. 90:33-7. June 1935
Presents some of the interesting features of the Brockport, New York, High School.

Wood Has Service to Perform in the School Building. By W. H. Scales. Nation's Schools. 16:47-9. August 1935. Illustrated
An excellent article on the place of wood and synthetic wood in school buildings. Tells of the modern and inexpensive one-story earthquake-proof buildings which have been built of wood in California.

Types of Construction and Materials as Related to the Original Cost, Maintenance, and Operation of School Buildings. By F. R. Scherer. Review of Educational Research. 5:383-7. October 1935. Bibliography
A very good summary of the literature on this topic.

School Building Specifications. By W. E. Sheffer and H. Bradley. School Executives Magazine. 53:173. February 1934
Sets up a check list to be applied to school building specifications. Valuable in setting up such specifications and in evaluating those which have been set up.

Supervising School Building Construction. By Ray L. Hamon. School Executives Magazine. 54:326-28. July 1935
Discusses some of the salient factors to be considered when school buildings are being constructed. Makes recommendations regarding the qualifications of the supervisor, his duties, and the cost of supervision.

Building Supervision Pays High Dividends. By R. L. Hamon. Nation's Schools. 13:53-4. April 1934
Explains how adequate supervision can be secured and the advantages of such supervision.

Heating, Ventilation, and Sanitation in School Buildings. By H. W. Schmidt. Review of Educational Research. 5:344-61. October 1935. Bibliography
A brief but excellent review of the literature on heating, ventilation, and sanitation in school buildings.

National Board of Fire Underwriters. Building Code. 5th edition, revised. National Board of Fire Underwriters, New York, 1931.
Provides basis references on safety in school buildings.

4b. BUILDINGS: SPECIAL ROOMS

The Biological Science Building of the State College of Washington. By Stanley A. Smith. American School and University. 1936. pp. 384-87
Gives floor plans and describes the new biological science building at Washington State College.

The Physical Plant for a Modern Program of Vocational Education. By F. J. Jeffrey. American School and University. 1936. pp. 413-18
In addition to giving illustrations, explains how the building was planned so as to permit efficient expansion, how movable metal partitions are used, how outside light is controlled, the placing of lockers and washbasins on the shop balconies, and means of securing flexibility.

A New Printing Shop in the Frank V. Thompson School, Dorchester District, Boston. By Edward C. Emerson. American School and University. 1936. pp. 419, 420
Describes layout and equipment of the printing shop in the Thompson school.

Technical Education in Chadsey High School, Detroit. By Earl L. Bedell. American School and University. 1936. pp. 421-24
Illustrations and explanations of the curriculum at the Chadsey High School, which endeavors to train for life interests.

The New Cousens Gymnasium at Tufts College. By John T. Whitmore. American School and University: Sixth Edition. 1933-34. pp. 178-181
A description of the major features of the new gymnasium at Tufts college.

Planning Residence Halls. By Harriet Hayes. Bureau of Publications, Teachers College, Columbia University. 1932. 247 pp. $2.25
Outlines the essential details which need to be given preliminary consideration, the desirable physical facilities, and provisions for safety and general welfare.

Some Administrative Problems of the High School Cafeteria. By Willard S. Ford. Bureau of Publications, Teachers College, Columbia University, New York. 1926. 191 pp.
Discusses suggested layouts for school cafeterias and proposes standards which may be used in determining room sizes and space relations.

The High School Classroom. By R. E. Green. American School Board Journal. 88: 37-38. January 1934
Summarizes the trends in school building construction, and the desirable physical characteristics of the high school classroom.

Science Buildings. Architectural Review. 4: 225-227. December 1933
Plans and illustrations of the new "Science Block" at the Beeford School.

A Mathematics Room That Speaks for Itself. By Edith L. Mossman. School Science and Mathematics. 33: 423-430. April 1933

Discusses essentials in planning a mathematics classroom, its equipment and decoration.

The Science Laboratory in the Small High School. By W. W. Carpenter and Ralph Watkins. American School and University 1933-34. pp. 306-309
Presents illustrations and standards helpful in planning science laboratories for small schools.

Summary of the Report of the Committee on Laboratory Standards in Secondary Schools. Science Education. 18: 60-61. February 1934
In addition to giving an abstract of the committee report, presents standards for laboratory equipment.

Summary of Research and Opinion of Library Planning. By E. C. Bolmeier. Bulletin of Department of Elementary School Principals of the National Education Association, Washington, D. C. Twelfth Yearbook. 12: 220-226. June 1933
Covers location, floor plans, decorations, equipment, furniture, and standards which are essential in library planning.

Library Planning and Design. By Edward L. Tilton. Architectural Forum. 56: 567-572. June 1932
Gives plans and illustrations of different types of library floor plans.

An Elementary Printing Course. By Earle L. Hadley. Industrial Arts and Vocational Education. 23: 58-59. February 1934
Presents plans for a junior high school print-shop layout and gives a list of necessary equipment.

Shop for Sheet-Metal Work. By Gaird Hood. Industrial Education Magazine. 36: 82-83. March 1934
Provides a suggested sheet-metal shop layout and list of necessary equipment.

Vocational Agriculture in Rural High Schools. By Louis M. Roehl. Industrial Arts and Vocational Education. 21: 158-162. May 1932
Describes and suggests layout for separate vocational agricultural building in rural community.

Planning and Equipping the Unit Kitchen. By Doris W. McCray. Practical Home Economics. 11: 349-350. December 1933
Treats the planning and equipment of high school kitchen and foods laboratory.

Principles Underlying the Physical Layout of a Commercial Department in a High School. By Allan Davis. Eastern Commercial Teachers Association Yearbook. 6: 5-13. 1933
Suggests lists of equipment for the various commercial classrooms.

Building Efficient Work Units for the School Cafeteria. By Fred I. Byerly. Practical Home Economics. 11: 361-362. December 1933
Discusses the plans and equipment of the cafeteria unit in the Rufus King High School, Milwaukee.

Modern Swimming Pool Construction. By E. H. Darling. Canadian Public Health Journal. 24: 420-428. September 1933
A comprehensive treatment of swimming pool construction, lighting acoustics, heating, and auxiliary features.

The School Swimming Pool. By Andrew P. Hill and Charles W. Bursch. California State Department of Education, Division of Schoolhouse Planning, Sacramento, Calif. 17 pp.
Provides a check list and an excellent set of standards for swimming pool construction.

The Essentials of Swimming Pool Sanitation. By C. A. Scott. Follett Publishing Co., Chicago. 1933. Illustrated. 142 pp.
Discusses the various types of sanitation apparatus for swimming pools.

Planning the Recreation Building. By Raymond E. Hoyt. Recreation. 28: 221-223, 258. August 1934
Presents many suggestions relative to the planning of community recreation rooms in the school.

San Francisco's New School-Business Administration. American School Board Journal. 88: 19-20. April 1934
Presents illustration and floor plans of the new administration building in San Francisco.

On Progressive Art Rooms. By R. E. Cote. American School Board Journal. 88: 40-1. March, April, May 1934.
Consists of a series of articles on the ideal equipment and layout for art rooms.

Putting the White House Conference Ideals Into Effect. American School Board Journal. Vol. 85: 35-37. August 1932
Describes and illustrates special therapy rooms and equipment of the Ann J. Kellogg School, Battle Creek, Michigan.

Planning Men's Dormitories for Ttoday and Tomorrow. By William M. Ingemann. American School and University. 1933-34. pp. 275-278
Suggests means of securing both beauty and economy through careful designing. Provides illustrations and suggestive layouts.

Servicing a Modern Laboratory from a Central Delivery Room. By W. B. Foulk. American School and University. 1933-34. pp. 298-305
Discusses the equipment and layouts suitable for servicing a modern laboratory from a central delivery room.

Rooms, Service and Furnishings for Biology Departments in Teachers' Colleges. By Harry A. Cunningham. American School and University. 1933-34. pp. 310-314
Discusses the layout and equipment vital for such departments. Illustrated.

Indoor Play Facilities for College Women. By Gavin Hadden. American School and University. 1935. pp. 189, 190.
Gives the results of a study of indoor play facilities provided for women by a number of the leading colleges and universities. Develops a list of desirable facilities.

The Winter Erercise Building at the Choate School, Wallingford, Connecticut. By Rev. George C. St. John. American School and University. 1935. pp. 195, 196
Describes the planning of the winter exercise building, giving floor plans.

School Library Planning and Equipment. By Lucile F. Fargo. American School and University. 1935. pp. 227-232
Suggests the need for planning the library and its equipment upon a functional basis. An excellent article with well-chosen plans and illustrations.

Office Practice—An Integrated Laboratory Project. By Edward J. McNamara. American School and University. 1935. pp. 233-235
Outlines the equipment and layout needed for the office practice unit of the commercial department.

Dormitory Design and Equipment. By Inez V. Bozorth. American School and University. 1935. pp. 302-306
Discusses such factors as size of residence units, location and orientation, main floor arrangements, dining room and kitchen layout, student rooms, essential equipment, etc.

Dick's House—The Dartmouth College Infirmary. By Jens Frederick Larson. American School and University. 1935. pp. 307-310
Discusses the plan and equipment of the new Dartmouth College infirmary. Illustrated.

Recent Trends in Laboratory Construction, with Special Reference to Chemical Laboratories. By C. R. Hoover. American School and University. 1935. pp. 339-343
A comprehensive treatment of recent developments in science laboratory construction. Well illustrated.

Physics Classrooms and Laboratories in the Wichita High Schools. By J. W. E. Stogdill. American School and University. 1935. pp. 344, 345
Gives an illustration of the layout for the physics classrooms and describes the major features.

The Science Building of Marlborough College, Wiltshire, England. American School and University. 1935. pp. 346-348
Presents plans and illustrations of the new science building at Marlborough College. It has a number of unique features both with regards to plan and construction.

Room Design and Equipment Requirements for Sight-Saving Classes. By Winifred Hathaway. American School and University. 1936. pp. 245-51
An outstanding article on both artificial and natural lighting, which is applicable not only for sight-saving classes, but for all classes. Includes a number of unique illustrations, showing the varying light intensities in different parts of the rooms.

The Physical Administration of the Book Collection. By William M. Randall. American School and University. 1936. pp. 261-264
Presents two of the major functions of the library, that of preserving the books collected, and that of making them accessible to the readers, and develops a number of the problems involved in carrying out these functions. Provides an excellent treatment of the major problems involved.

A Plan for a One-Room Home-Making Department. By Ata Lee. American School and University. 1936. pp. 334-336
Presents plans for a rather complete one-room home-making department layout, and lists the needed equipment.

The New Chemistry Laboratories of the College of Arts and Sciences, Georgetown University. By Lawrence C. Gorman. 1936. pp. 375-378
Gives illustrations and explanations of outstanding features of the new chemistry laboratories building at Georgetown University.

The New Engineering Building at the University of Virginia. By W. S. Rodman. American School and University. 1936. pp. 379-383
Presents illustrations and explanations of the outstanding features of the new engineering building at the University of Virginia.

The School Executive's Office. By Arvid J. Burke. School Executives Magazine. 54:181-182. February 1935
Provides a check list of the equipment which should be provided in the school executive's office.

A Plan for a Social Science Suite. By H. Z. Wooden and Others. School Executives Magazine. 54:262-4. May 1935. Illustrated
Describes plan of and equipment for a social science suite. Excellent.

A Game Room for Elementary Schools. By Bertha Smith. School Executives Magazine. 54:265-7. May 1935. Illustrated
Describes the planning of a game-room unit which is suitable for both school and community purposes.

Planning the Social Studies Classroom. By Albert A. Orth. American School Board Journal. 92:30-33. January 1936. Illustrated
Gives details to be considered in planning a classroom to be used for social studies.

Equipping the School Art Studio. By Belle Boas. School Executives Magazine. 55:191-2. January 1936
Outlines the essentials which must be considered in planning and equipping a modern high school art room.

The Junior High School Stage. By Erik A.

Anderson. School Executives Magazine. 55:-300-1. April 1936
Discusses the necessary equipment and the planning which can make the modern school stage a true educational laboratory.

Planning the Mathematics Classroom. By Fred L. Bedford. School Executives Magazine. 55:290-2. April 1936
Outstanding article on planning a modern mathematics classroom.

Special Rooms for New Chicago Elementary School Buildings. By Don C. Rogers. American School Board Journal. 88:34. January 1934
Presents plans for principal's office unit, library unit, and kindergarten unit, all of which are effectively planned.

4c. BUILDINGS: DECORATION

Modern Decorative Methods Beautify Concrete Interiors. By S. P. Moore. Nation's Schools. 11:29-32. February 1933. Illustrated
A very interesting article on ways of decorating concrete interiors.

Case for Color in School Buildings. By J. Jay. American School Board Journal. 52:26-8. August 1932
Stresses the importance of using color, when well chosen, to relieve the monotony of the ordinary sameness in school color schemes.

School Library Decoration. By Alice Hogge Baer. Bulletin of Department of Elementary Principles of the National Education Association, Washington, D. C. Twelfth Yearbook. 12:217-219. June 1933
Offers many suggestions on library decoration.

4d. BUILDINGS: COSTS

Building an Elementary School in the Depression. By Clem O. Thompson. American School and University: Sixth Edition. 1933-34. pp. 52-54
Points out possible economies in school plant construction.

Extra Costs and Incidental Costs in the Erection of School Buildings. By Frank M. Misner. Bureau of Publications, Teachers College, Columbia University, New York. 1934. 79 pp. $1.60
A scientific analysis of causes and types of "extra" costs encountered in erecting a school building. Presents a check list which will enable school authorities to reduce and largely eliminate "extra costs."

Eliminating Extra Costs in Construction. By F. M. Misner. Nation's Schools. 16:45-6. August 1935
Explains the causes of extra costs and the means of eliminating them.

Distribution of School-Building Costs. By G. D. Coons and D. L. Esses. American School Board Journal. 90:38-9. June 1935
Discusses the factors influencing distribution of school building costs for general, heating, ventilating, plumbing, and electrical contracts.

5. EQUIPMENT

Furnishings and Equipment for Residence Halls. By Mary De Garma Brye and Etta M. Hanby. Bureau of Publications, Teachers College, Columbia University, 1933. 95 pp.
Outlines the many factors affecting the selection of furnishings and equipment for residence halls.

Public School Plumbing Equipment. By Minor W. Thomas. Bureau of Publications, Teachers College, Columbia University, New York. 1928. 128 pp. $1.60
A comprehensive treatment of the field of public school plumbing equipment. Presents criteria to serve as a guide in judging plumbing equipment and in the arrangement of such equipment.

Buildings and Equipment for Home Economics. By Melvin Brodshaug. Bureau of Publications, Teachers College, Columbia University. 1931
An excellent treatment of the planning of home economics suites. Evaluates present practice and sets up objectives to guide in the planning of such suites. Covers building problems, space allotments, and equipment.

The University of Southern California Basket Locker System. By William R. Laporte. American School and University. 1933-34. 182-184. Illustrated
Describes the basket locker system in use at the University of Southern California. The system presented is practical for the large school.

Equipment of the Elementary Classroom. By Guy L. Hilleboe. School Executives Magazine. 52: 116-117. November 1932.
Compares the physical characteristics of the traditional and the modern classroom, giving special emphasis to types of seating essential in an efficient classroom.

The Kewaunee Book of Laboratory, Vocational and Home Economics Furniture. Kewaunee Manufacturing Company, Kewaunee, Wis. 1932. 455 pp.
Plans and illustrations of suggestive layouts for the science laboratory, home economics unit, art room, commercial room, kindergarten, cafeteria, and shops.

Library Equipment and Appliances. American Library Association Bulletin. 28:337-345. June 1934
Gives illustrations and descriptions of various items of library furniture and equipment.

Equipment for Industrial Education. By O. D. Adams. American School and University. 1933-34. pp. 314, 315
Deals with the selection and purchase of equipment best suited to the needs of industrial education.

Suggested Equipment for Teaching Business Subjects. By Charles E. Cook. Eastern Commercial Teachers Association Yearbook. 6:261-267. 1933
A committee report upon the equipment needed in a junior high school commercial department.

Commercial Education Equipment for Small High School. By William R. Odell. School Executives Magazine. 52:32. September 1932
Outlines the classroom provisions and equipment needed for commercial education in a small high school.

Expending the School Stage Lighting Budget. By A. L. Powell. American School and University. 1933-34. pp. 210-215
Points out the important factors in selecting stage lighting equipment. Tells how to get the most for the money, and provides suggested budgets for such equipment for amounts varying from $500 to $20,000.

Office Machine Equipment for the School With Moderate Funds. By Grace M. Kennedy. American School and University. 1933-34. pp. 218-220
Analyzes the equipment needed for the office practice unit in a vocational high school. Provides a suggested list of equipment.

How to Make School Radio Effective. By Cline M. Koon. American School and University. 1933-34. pp. 221-224
In addition to outlining the functions of radio in the school, discusses present trends in the selection and use of school radio equipment.

Looking Ahead in Radio. By Armstrong Perry. American School and University. 1935. pp. 221-223
Points out the probable implications of coming radio developments for the schools.

Utilizing Educational Talking Pictures in the Schools. By Frederick L. Devereux. American School and University. 1935. pp. 235-237
Not only discusses the utilization of educational talking films in the schools, but offers a layout and describes equipment required for classroom projection.

Forms and Equipment for the Keeping of Student Records. By Ira M. Smith. American School and University. 1935. pp. 238-241
Outlines the type of data which should be preserved and suggests the equipment necessary for keeping such student records.

School-Building Structure and Equipment for Efficient Use of Visual Aids and Radio. By Walter C. Martin. American School and University. pp. 256-260
A treatment of the problems involved in making efficient use of visual aids and radio in the schools. Covers such problems as extraneous noise, correct acoustical conditions, auditorium and special room design, and the selection of equipment to obtain the proper volume of sound.

Equipment of the General Business Training Classroom. By Foster W. Loso. American School and University. 1936. pp. 265, 266
Outlines the objectives of the general business training course and from them develops the room layout and equipment needed for effective functioning of the course.

Equipment for School Dramatics. By Theodore Fuchs. American School and University. 1936. pp. 267-276
A very comprehensive treatment of the layout and equipment necessary for the most effective school dramatics. Presents layout plans for the Shorewood High School Auditorium and accompanying dramatics units, which have many excellent features.

Purchase of Classroom Equipment. By Ray E. Cheney. School Executives Magazine. 54:20-21. September 1934
Analyzes many of the perplexing problems encountered by school officials in purchasing equipment.

Steel Wardrobes for Grade School Classrooms. By George M. Rohdes. School Executives Magazine. 54:186. February 1935
Discusses the economy and efficiency of steel wardrobes in grade school rooms.

Problems of Equipment Specifications. By H. W. Schmidt. School Executives Magazine. 55:52-54. October 1935
Outlines a number of principles which should be kept in mind when writing equipment specifications.

The Selection of School Lockers. By W. E. Long. American School Board Journal. 92:20-21. March 1936
Suggests important factors to be considered in the selection of lockers.

Fundamentals of Visual Education. By J. Raymond Hutchinson. School Executives Magazine. 55:186-8. January 1936
Discusses the planning and utilization of audio-visual aids in elementary and secondary schools.

Types of School House Doors. By Ray L. Hamon. School Executives Magazine. 55:172-4. January 1936. Illustrated
Discusses the planning of various types of desirable exterior and interior doors for the modern school.

Plan Your Seating Program. By E. J. Hummel. School Executives Magazine. 55:248-51. March 1936. Illustrated
Points out the necessity for planning a seating program, and explains how the maximum utilization may be secured.
A Plan for Selecting School Building Equipment. By J. P. Arp. American School Board Journal. 91:41. July 1935
Sets up criteria for selecting school equipment.
Facilities for an Activity Program. By F. M. Long. School Executives Magazine. 54:170-1. February 1935. Illustrated
Discusses the planning and equipping of a classroom suitable for use in connection with an activity program.
Accessory Equipment in Toilet Rooms. By Preston M. Geren. School Executives Magazine. 55:19. September 1935
An excellent article on the necessary equipment for toilet rooms.
Finished Hardware in Schools. By Bruce W. Angus. School Executives Magazine. 55:26-28. September 1935
Sets up standards for selecting serviceable as well as attractive hardware.

6. SPECIAL SCHOOL TYPES

A Modern Version of a Rural School. By Ernest Sibley. American School Board Journal. 92:43-44. January 1936. Illustrated
Has many unique features including its landscaping, site play areas, building arrangements, its school and community education program, and its social and recreational program.
The George P. Phenix Training School, Hampton Institute, Hampton, Va. By Warren S. Holmes. American School and University: Sixth Edition. pp. 62-65
Points out the fundamental needs of Negro education today and explains how the school was planned to make possible the fulfillment of these needs.
The New Rindge Technical School, Cambridge, Massachusetts. By Ralph Harrington Doane. American School and University. Sixth Edition. pp. 66-69
Describes and illustrates some of the major features of this school.
Rural Schoolhouses, School Grounds, and Their Equipment. By F. B. Dresslar and Haskell Pruett. Bureau of Education, U. S. Department of the Interior, Washington, D.C. Bulletin No. 21. 1930. 14 pp.
Although brief, this bulletin is an excellent source of information on design, function, location, and planning of rural schools. Well illustrated.
Campus Standards for Country Day and Boarding Schools. By G. D. Strayer, N. L. Engelhardt, and T. C. Burton. Bureau of Publications, Teachers College, Columbia University. 1930. 51 pp. $1
Provides a set of standards and a score card to be used in appraising present country day and boarding school plants and in planning future plants.
Trade Schools, School Projects, Field Buildings. Architectural Record, August 1934. Vol. 76. pp. 77-112
A series of articles with illustrations and plans on school plants, covers such topics as the need for new schools, recent trends in school plant construction, special school units.
The Open-Air School, Newark, N. J. American Architect. Vol. 147. November 1935. pp. 38, 39
Plans and illustrations of the new school are given.
The New Fresh Air School at Suresnes, France. American Architect. Vol. 147. November 1935. pp. 34-37
Plans and illustrations of the new school at Suresnes, France, which has many unique features.
The Rural School and Its Solution. By J. J. Donovan. Architect and Engineer. Vol. 97. pp. 35-56
Gives plans and illustrations of a number of smaller school buildings, high school, elementary and rural
New Science Building at Phillips Exeter Academy. By Wilhelm Segerblom. Journal Chemical Education. 9:766-769. April 1932. American School and University. 1932-33. pp. 336-339
Illustrations and description of the special features in the Exeter Academy.
Problems and Practices in Housing the Junior College Program in California. By Cecil Donald Hardesty. University of Southern California Press, Los Angeles. 1934. 153 pp.
An analysis of the factors affecting the housing of the junior college program in California.
The Planning and Equipping of Nursery Schools. By George D. Stoddard. American School and University. 1935. pp. 218-21
Outlines the opportunities offered by the nursery school and the essentials of a good nursery school plant. Well illustrated.
Parochial School Requirements. By Rev. William R. Kelly. American School and University. 1936. pp. 40-46
Gives plans and illustrations of parochial schools which are planned to meet the needs of different sized parishes. Outlines the various uses which such buildings must be planned to serve.
The Students' Health Service of the University of Minnesota. By Robert B. Radl. American School and University. 1936. pp. 341-346
Describes and presents floor plans and illustrations of the new health service building at the University of Minnesota.
Dormitory Design. By J. Binford Walford. American School and University. 1936. pp. 347-51
Presents plans and illustrations of two interesting examples of dormitory design, Taliaferro Hall, College of William and Mary, and a new dormitory group at State Teachers College, Fredericksburg, Virginia.
Schools for Physically Handicapped. By David E. Weglein. School Executives Magazine. 54:274-5. May 1935
Discusses the planning and equipping of schools and classrooms for the physically handicapped.

7. BIBLIOGRAPHIES

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A selected list of recent publications in the field.
School Buildings, Grounds, Equipment, Apparatus and Supplies. By T. C. Holy. Review of Educational Research. December 1932. pp. 343-441. American Educational Research Association, Washington, D. C.
A comprehensive though brief review of the literature on school buildings and equipment.
A Bibliography of School Buildings, Grounds, and Equipment. By H. L. Smith and L. M. Chamberlain. Bureau of Cooperative Research, Indiana University, Bloomington, Ind. 1928-35. Parts I-IV
A very comprehensive series of annotated bibliographies on all phases of school buildings. Part IV covers materials up to October 1934.
Bibliography of College and University Buildings, Grounds and Equipment. By H. L. Smith and T. R. Noffsinger. 1934. Bulletin of the School of Education, Indiana University, Bloomington, Indiana. 75c
A very comprehensive, briefly annotated bibliography covering all phases of college and university buildings, grounds and equipment.
A Bibliography of Fifty Outstanding Books on School and College Buildings and Allied Topics. By William J. Lowry. American School and University. 1936. pp. 60-62
The list includes books of relatively recent publication and covers the planning and maintenance of school buildings.



KITCHEN, LANE TECHNICAL HIGH SCHOOL CHICAGO, ILLINOIS

RAMPS VERSUS STAIRS FOR SCHOOL BUILDINGS

By WILLIAM H. WEEKS, ARCHITECT

After close observation and checking, over a period of years, I have become convinced that the incline (or ramp) is much to be preferred over the stairway as a means of travel between floors of the school building. The reasons are the following:

(1) It has been demonstrated that the incline can be built with the extra space included for practically the same cost as a first-class stairs.

(2) The ramps are practically 100 per cent safe in case of fire or panic. In checking on the use of the best constructed stairs, I have found records of many accidents, whereas I have yet to find a record of one accident on inclines.

(3) The inclines are more easily kept clean, because the many angles and corners found in the average stairs are eliminated and the cost of janitor's service is thus reduced.

(4) The ramps give children a sense of security not found in stairs.

(5) The ramps are more adapted to the varying strength of children and adults.

(6) It is possible for cripples in wheelchairs to go from floor to floor.

(7) The ramps are less noisy.

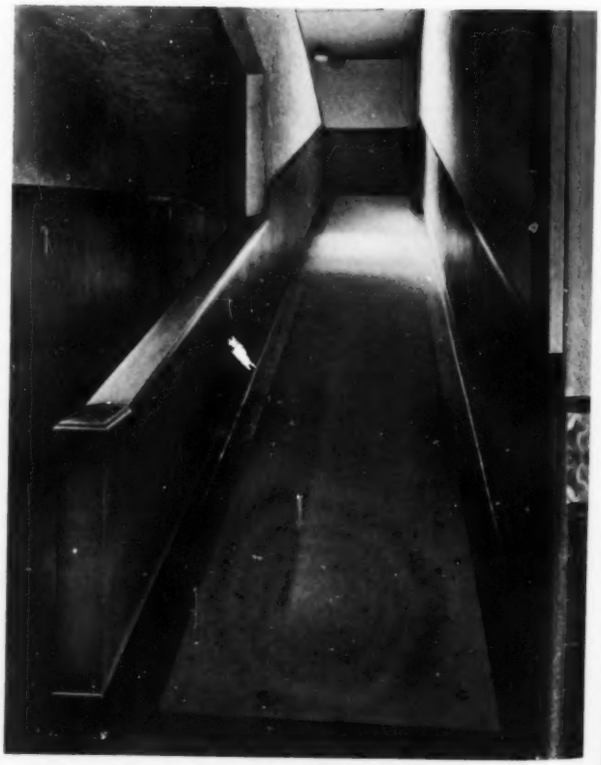
(8) The ramps cost practically the same as stairs.

(9) Service elevators can be eliminated. All supplies and furniture can be taken from floor to floor.

Construction: I have built ramps as much as 2¼-inch rise to the foot, and they have proved satisfactory, but careful personal observation suggests 2 inches as a safe and satisfactory slope for schools. The material used should be fireproof. I have used reinforced concrete in practically all my installations and have found this material very flexible and satisfactory. The floor of the incline should be covered with cork carpet or rubber matting.



Photographs by J. Walter Collinge



School ramps designed by Weeks and Weeks, architects

BETTER ACOUSTICS FOR THE SCHOOL

BY FREDERICK L. DEVEREUX
vice-president, Erpi Picture Consultants, Inc.

In the preparation of this article, Colonel Devereux had the assistance of J. P. Maxfield and G. T. Stanton of Electrical Research Products, Incorporated. Mr. Maxfield is at present in charge of technical consulting and new developments of his company. Mr. Stanton has conducted the noise study of rapid transit lines in New York City, the noise study ventilation in buildings for the Port of New York Authority, and large parts of the survey for the New York Noise Abatement Commission.

The success of the oral portion of the educational program depends on the extent to which the students hear and concentrate upon the educational material so presented. While the demand for good hearing conditions has always been present, the advent of the talking motion picture as an instrument of education has focused attention anew on the problem of school acoustics.

High cost of noise: It is perhaps reasonable to assume that all concerned with modern schools—the officials directing their activities and the architects who plan them—are aware of the harmful effects of noise and that in all new designs precautions will be taken to avoid excessive noise. On the other hand, it is doubtful if the enormous economic loss to the educational community occasioned by an apparent disregard of this factor is appreciated.

A recent survey of 846 public school buildings showed that some 30% of the classrooms were almost useless by virtue of disturbing and interfering noise. If we accept these figures it would indicate approximately $150,000,000 worth of school property which is unfit for educational purposes. A consideration of this vast sum predicates the reasonableness of adopting what might otherwise be called extreme measures to insure reasonable quiet in the classroom.

It may be argued that this much property is not valueless since most of the classrooms included in the category of "useless" are actually continued in use today. If we admit that, then the education of the children compelled to use these rooms is defective because of the extremely noisy conditions, and we must face the fact that of the total enrollment in the schools surveyed upwards of 400,000 children are receiving less education than is being provided by the taxpayers and, in addition, are living during the school day in an environment unfavorable to healthful development.

Teaching loss in noise: That noise is directly harmful is borne out by an increasing amount of scientific data, the bibliography of which is too lengthy to mention here. Two brief examples may serve to indicate the seriousness of uncontrolled noise. Dr. Donald Laird of Colgate University in a series of carefully controlled tests showed that routine work, comparable to the effort of school children, required the expenditure of 19% more energy to accomplish a given quantity of work in a noisy room than was required in the same room after acoustic absorbing material was placed on the ceiling. The difference in noise level in the room under these two conditions was small compared with the excess noise level over reasonable amounts which may be found in many classrooms.

Aside from unnecessary expenditure of energy which, especially in the young, may lead to depleted health and nervous disorders, the ability to master new subjects in an educational curriculum is reduced, even though more energy be expended. Elaborate experiments were conducted by the Noise Abatement Commission in collaboration with Frank S. Hackett, principal of the Riverdale School, New York. These experiments continued for a week and involved the entire student body of the school. Without dwelling on the nature of the tests, which are recognized tests of reading comprehension, it was significant that under the loud noise conditions, a loss of over 7% in ability to comprehend was noted. In considering this loss it should be appreciated that this was a measure solely of loss of ability to comprehend visual instruction and that no allowance was included for the probably larger loss had the instruction been of an audible nature.

In general these tests were made with an electrically produced, continuous harmonic noise. The disturbing value, sometimes called "annoyance," of noise, while proportional to the loudness, is also largely affected by the quality of the sound.

CONTROL OF SOUND



noise measurement tests for the New York Noise Abatement Commission

Courtesy Electrical Research Products, Inc.

Irregularly produced, non-rhythmic sound creates a high degree of disturbance. Sounds of inharmonic nature are naturally more disturbing than harmonic sounds and there is some evidence of increased disturbance from sounds of high basic pitch. In our modern life, the majority of urban noises are traffic-created and thus unfortunately comply with the requirements of high annoyance. It is evident, therefore, that the quantitative data, briefly referred to above, in both cases represents only a fractional part of the deleterious effect of noise as generally experienced in our urban schools.

Sound-insulating the school: The architect faced with the responsibility of designing a school in one of our congested urban districts is admittedly in a difficult position. The school site is of necessity located at or near the population center of the area which it serves and therefore is generally assailed by high external noise levels originating from traffic and, in some cases, industrial sources. The disparity between a reasonably tolerable noise level within the classroom and that existing externally is so great as to require frequently drastic treatment.

The obvious remedy is construction of a building with noise reduction properties equaling or approximating the difference between the external and the desired internal noise level. Such a building must, of course, be windowless or have fixed windows with sound isolating properties equal to those of the building structure. This in turn involves artificial ventilation, again introducing additional complexities to the design proper.

Means of sound control: Noise is a quantitative entity which may be measured and classified in defined units. In specific cases the noise level prevailing on the selected school site may be determined for definite comparison with the desired internal noise level. The amount of improvement which may be obtained by all of the available means of noise reduction may similarly be expressed in quantitative terms, thus permitting a study of the potential internal noise level which may be reached by various plans. The desirability of these plans in comparison with their respective costs should indicate the proper procedure to be followed.

The various planning steps which may be considered are (1) selection of least noisy site; (2) detour of traffic; (3) cooperative reduction of local industrial noises; (4) extraordinary maintenance of street surfaces; (5) shielding; (6) internal arrangement of rooms; (7) acoustic treatment of rooms; (8) insulation of building structure.

Prevailing noise levels: The need for a completely inclosed air-conditioned building to exclude noise, depends on the aggregate reduction that may be accomplished by shielding, arrangement and acoustic treatment. In a modern classroom noise levels should not exceed 40-45 db above the threshold of hearing. Along our average city streets in daytime hours the prevailing noise level will average around 70 db and in some of the extreme cases will continue at levels as high as 90. In New York City some progress has been made by cooperative efforts of the Noise Abatement Commission, Board of Education and the Police Department.

CONTROL OF SOUND



sound level meter used in measuring conditions of noise

Courtesy Electrical Research Products, Inc.

in arranging for the detouring during school hours of a large part of the very heavy traffic from those schools most seriously affected, although in some locations it is impracticable to reduce this excessive level in the immediate vicinity of the school building. In suburban districts a street noise level of 60 db may be expected.

Shielding against noise: Sound tends to some degree to travel in more or less straight lines expanding along its own front as it progresses. Areas therefore cannot be shadowed completely as in the case of light, but nevertheless relatively large reductions in noise may be obtained by shielding or partial acoustic shadowing. Where the principal noise disturbance on a proposed school site is reasonably localized along one side or at one point near the area, advantage may in some cases be taken of the shielding effect of existing buildings. In multi-structure schools the arrangement of the individual buildings may be such as to shield the classroom sections from the external noise. Reasonably quantitative information as to the reduction which may be obtained under any given set of circumstances is available.

Another method is the arrangement of the internal spaces of the building so that classrooms having the most severe minimum noise requirements are located on the side away from the principal noise source or even at the interior of the building, whereas vocational rooms, gymnasiums and similar spaces can be placed at the points of severest disturbance. Extraordinary improvement can frequently be accomplished through somewhat unconventional arrangements. Equal consideration should be given to adequate protection or isolation of classroom from those vocational rooms which, because of machinery or other sources, may create high noise levels.

Acoustic treatment: A material reduction of noise level may be obtained by the application of acoustic material within the classroom itself. Care should be taken, however, that the requirements for proper room acoustics are not violated by the addition of too great a quantity, by the improper distribution or the improper type of sound-absorbing material. In a classroom, more particularly in the larger classroom or auditorium, the objective is an efficient transmission of sound from point to point. It is generally recognized that an excessive amount of reverberation, which is manifested by an extreme prolongation of each of the individual syllables or speech sounds, is destructive to intelligibility, but it is somewhat less well known that a room can be made too dead for good intelligibility. A treatment which will give best acoustic conditions will generally yield so nearly the maximum noise reduction as to indicate the desirability of determining the quantity of material on an acoustic rather than on a noise reduction basis.

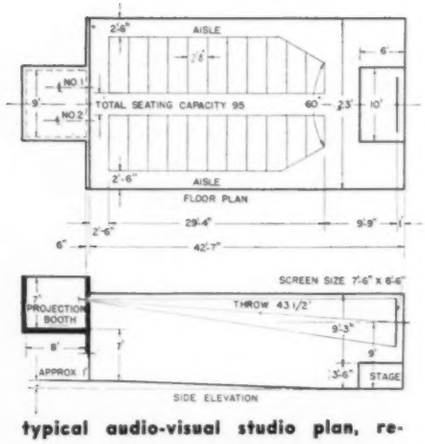
Quality and distribution of material is important in the small classroom but becomes an imperative consideration in the large rooms, such as an auditorium. Here, careful thought must be given to the amount of absorption at various audible frequencies to insure a proper balance of the reverberant sound energy.

CONTROL OF SOUND

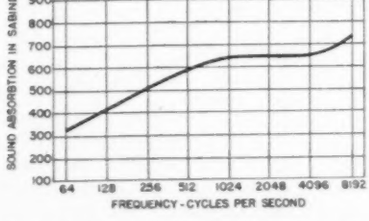


a classroom in the Roosevelt School, New Rochelle, New York, specially adapted for audio-visual instruction

From The Educational Talking Picture



typical audio-visual studio plan, reproduced from "The Educational Talking Picture," by Frederick L. Devereux



desired sound absorption for acoustic materials in a studio of the size indicated by the plan shown above

The distribution of material about the auditorium must be such as to permit the maximum enhancement of sound from the stage or platform with the minimum of discrete disturbing reflections. The principles which govern acoustics of theaters should be fully applied in considering the school auditorium, allowance also being made for the probable use of sound reinforcement and educational talking pictures.

Extent of noise reduction: It is, of course, impracticable to indicate, except in a specific case, the amount of reduction which may be accomplished by any of the measures suggested here. However, reductions of 8 to 12 db from localized sources have in some instances been realized by the shielding of buildings. Differences in noise level on opposite faces of a building, one exposed to noise and the other open, may run from 10 to 20 db, depending upon the nature and location of the noise source with respect to the building. Obviously for those rooms which may be located within the interior of the building, little consideration need be given to the external noise level as the reduction so obtained is large as compared with the reduction required. By the use of acoustic absorbing materials within the room in an amount consistent with good acoustic properties, reductions of the order of 5 to 8 db may be anticipated.

Audio-visual studios: The growing use of talking motion pictures in the modern educational program increases the need for proper acoustic conditions in individual classrooms as well as in large auditoriums. In addition the school should include, in proper ratio, special purpose rooms providing maximum facilities for talking picture programs. The accompanying illustration shows a typical plan for such a room, called an "audio-visual studio." The best acoustic condition for such a studio will be obtained by concentrating the sound-absorbing material on the wall opposite the screen with a limited amount distributed along the side walls. The absorption offered by the acoustic treatment should, for a room this size, equal the amount shown in the chart. In this curve the absorption is measured in sabines or units equaling one square foot of 100% absorption. It will be noted that different quantities are indicated for various frequencies. This is important in order to secure the correct balance in the amount of reverberation for each portion of the sound frequency spectrum.

Control of internal noise: Precaution must be taken to avoid the creation of disturbing noises within the building itself or to permit their transmission into the classroom or other quiet sections. In the inclosed air-conditioned building this requirement becomes of greater significance, owing in part to the lower prevailing noise level and in part to the air-conditioning machinery and to the avenues of sound transmission afforded by the ducts. The means for preventing disturbance from these sources—such as elastic support for the machinery, flexible connections between machinery and ducts, sound-absorptive linings between ducts, and the like—are well known.

CONTROL OF SOUND

A basic standard for the measurement of sound has just been set up for the first time through the work of an American Standards Association committee, directed by the Acoustical Society of America. Measurement of sound is the first step in the control of noise. The new standards for noise measurement and for sound level meters establish a uniform reference system. The specification of loudness is described in a report by Harvey Fletcher, chairman, Subcommittee on Noise Measurement, from which the accompanying paragraphs are quoted.

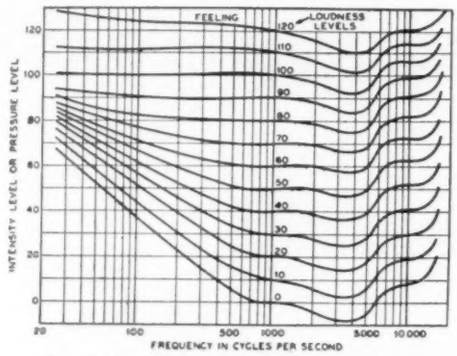


figure 1—intensity level of pure tones of different frequencies must be changed to maintain a given loudness level

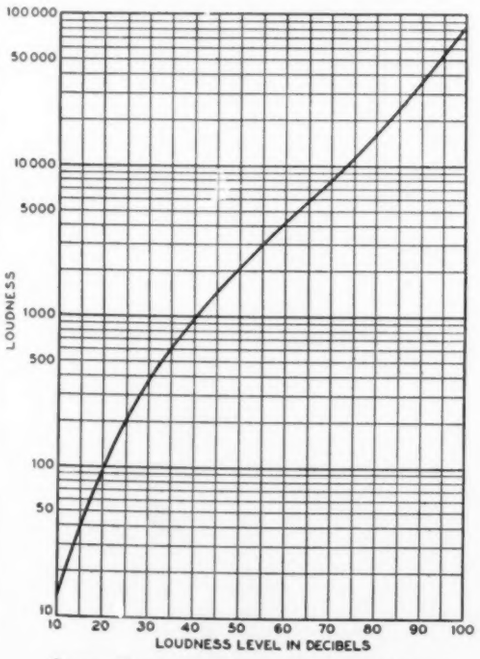


figure 2—curve shows relation between loudness as measured in loudness units and the loudness level measured in decibels

AMERICAN STANDARD FOR MEASURING NOISE LEVELS

Some physical quantities, such as weight or length, are stated as so many pounds or feet added to nothing at all. However, such a quantity as altitude is measured as so many feet above a reference level, usually sea level. Intensity level is like altitude and is most conveniently stated as so many units above a value arbitrarily chosen as "reference level." The unit chosen for indicating the difference between a given intensity level and reference level is the "decibel."

While intensity level is a physical quantity, the loudness of a sound depends on the ear and on the observer's judgment. To guide this judgment a reference tone has been selected and loudness has been defined. By definition, the loudness level of any sound is the intensity level of an equally loud 1,000-cycle reference tone. By making such comparisons with the 1,000-cycle reference tone, the loudness levels of pure tones having frequencies and intensities throughout the audible range were measured. The results are shown in the curves of Figure 1. The curve marked "0" represents the faintest sounds that can be heard and the one marked "120" the loudest that the ear will tolerate. Referring to the "0" loudness curve it is seen that as the frequency decreases from 1,000 cycles, more and more intensity is necessary to make the sound audible. On the other hand at higher levels, for example 90 decibels, sounds are almost equally loud as the frequency is decreased.

Among several practical uses for these curves may be noted the case where a particular noise is compared to a tone of, say, 100 cycles. If the intensity level of this tone were found to be 58 to sound equally loud to the noise, then following the curve to the right shows the loudness level to be 30 decibels. Thus we see that by using this set of curves any pure tone can be used for finding the loudness level of a noise.

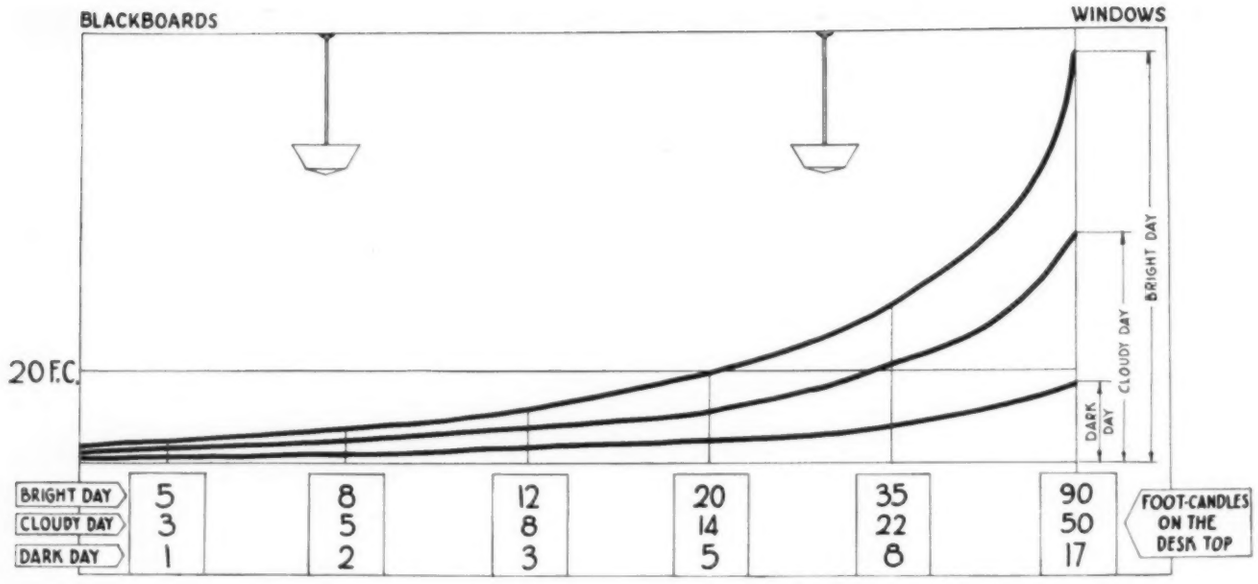
Relative loudness: Although loudness level values define precisely the loudness of any sound, the numbers on such a scale do not correspond to the relative loudness that is experienced by most people. If you give a person the reference standard and ask him to turn the dial until the loudness of the sound has been doubled, how many db will he change it? To get an answer to this question large numbers of observations on such judgments were taken, both in this country and in England. In the intensity range where most noises were heard, it was found that the intensity level of the reference tone was increased about 10 db to produce double the loudness. Judgments were taken to find the changes in intensity level corresponding to ½, ¼, 1/10, and other changes of loudness. In this way the relationship between loudness and loudness level has been found. It is shown by the curve of Figure 2. This relationship has also been accepted as a tentative standard.

To illustrate further the meaning of loudness and loundness level when applied to practical problems, Table 1 shows the loudness of noises which are familiar to most every one. It will be seen that the loudness values range from one to one million corresponding to a loudness level range of about 126 db.

It is expected that the adoption of these standards will make it possible to write more definite specifications regarding noise conditions, which in the end must also bring about desirable noise reduction.

TABLE 1: LOUDNESS OF TYPICAL NOISES

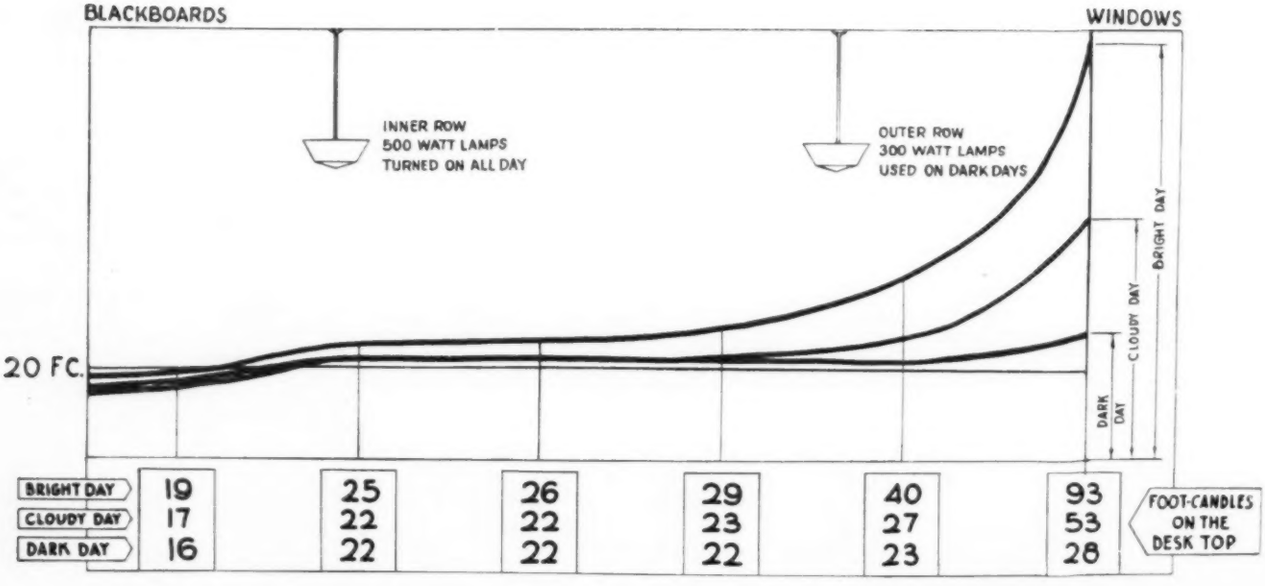
NOISE SOURCE	DISTANCE OF LISTENER	LOUDNESS LEVEL	LOUDNESS
Threshold of pain	—	126 db	1,000,000
Airplane	18 feet	123 "	700,000
Hammer on steel plate	2 "	120 "	550,000
Riveter	35 "	105 "	140,000
Elevated train	20 "	95 "	60,000
Heavy street traffic	50 "	85 "	25,000
Average motor truck	30 "	80 "	17,000
Average automobile	30 "	70 "	8,000
Conversation	3 "	65 "	6,000
Quiet automobile	30 "	56 "	3,000
Loud whisper or soft voice	2 "	45 "	1,500
Suburban street (no traffic)	—	36 "	700
Average whisper	2 "	28 "	300
Rustle of leaves by gentle breeze	—	16 "	50
Noise of ordinary breathing	1 "	10 "	14
Threshold of hearing (in soundproof booth)	—	0 "	1



NATURAL LIGHTING



Since most classrooms are used largely for daytime work, arrangements should be made for controlling and distributing artificial light to supplement daylight when necessary. Natural daylight alone is insufficient, as shown by the illustration. Illumination is strong near the windows, but falls off rapidly across the room.



BALANCED LIGHTING



A minimum illumination level of 20 foot-candles can be maintained almost evenly across the room by adding artificial lighting in quantities indicated on the diagram. A full-sized demonstration and experimental classroom utilizing this principle has been installed in the General Electric Institute at Nela Park, Cleveland.

CONTROL OF LIGHT

By ALSTON RODGERS, engineer
General Electric Company

BETTER LIGHT FOR THE CLASSROOM

Most of our thoughts and actions are controlled and dictated by our sense of sight. A human being is, to a large extent, a seeing machine. By far the greatest part of our learning is gained through the eyes.

In view of this fact, particular attention is paid to the eyes of school children today. Eye examinations are now conducted regularly in practically every school, and eyeglasses or treatments by competent eyesight specialists are recommended for students with defective vision. There are still many whose visual defects remain uncorrected, but a large number of children with poor eyesight have been given normal vision by these precautions.

The only aid to overburdened *normal* eyes, however, is in making the job of seeing easier. To this end, difficult seeing tasks are eliminated, as far as possible, from the lower grades. For children with very subnormal vision "sight-saving" classes have been instituted in many schools: textbooks are printed in very large type, oversized pencils and blackboard crayons are employed to make classwork more visible, and the children are required to rest their eyes for prescribed periods.

Not until recently has better lighting been recognized as one of the most important aids to vision. New knowledge of light and seeing, gained from years of scientific research, has shown that better lighting improves visibility as effectively as increasing the size of type in textbooks or seating the pupils closer to the blackboard, and it is generally a more economical expedient. Furthermore, it has been proved that seeing is not done by the eyes alone. It is work done by the whole body; it affects the nerves, the muscles, the heart, and the brain. Difficult seeing is a drain on physical energy, and often results in nervous disorders and undue fatigue.

Conditions of seeing: Since light affects us so materially, the question arises, How much light should we have for easy seeing? The photronic cell light-meter makes it possible for us to measure illumination as simply and accurately as a thermometer enables us to measure temperature.

Outdoors in the direct sunlight of a bright summer day, the illumination may be in the order of 8,000 to 10,000 foot-candles. Probably this would be too brilliant and annoying for reading a book printed on white paper. However, the shade of a tree or porch would be quite comfortable for such work. Here we might expect to find several hundred or a thousand foot-candles. Even on a dark rainy day we have several hundred foot-candles outdoors. Under these conditions of abundant natural light the human eye has developed for ages. Now, with even more difficult visual tasks imposed by our civilized world, we expect our eyes to function equally well with only a very small fraction of this illumination. At present, in our schoolrooms, we find 3-5 foot-candles, or less, of artificial lighting.

The eye can adapt itself, of course, to see with only a little light. It is possible to read under bright moonlight (about 1/50 of a foot-candle). Such a condition might be termed one of "barely seeing" as opposed to "easy seeing." Present provisions for artificial lighting are certainly far down toward this "barely seeing" range.

Ease of seeing does not increase in direct ratio with the addition of foot-candles. If we wish to advance toward nature's seeing conditions in equal steps of "better seeing," we must increase the illumination in about the following series of foot-candle values: 5-10-20-50-100-200-500-1,000. Each step-up represents an equal improvement in ease of seeing.

Although daylight outdoors actually varies through a range of hundreds and thousands of foot-candles, it constitutes a change of only a few steps in "seeing effectiveness." Our lighting indoors is many steps lower. For this reason, by the addition of a comparatively few foot-candles, increasing the artificial illumination to values of 10, 20 or 50, we can actually effect improvements in "seeing" comparable to the change between a gloomy day and a clear day outdoors.

Standards of lighting: Artificial lighting was invented originally to compete against darkness—to give "just a little light, something better than the dark." Today, science has advanced to the point where artificial lighting can be a competitor of daylight—it can provide seeing conditions comparable to nature's provisions.

Fifty years ago it would have been impractical to supply even 10 foot-candles of artificial illumination throughout a classroom because of high cost and technical limitations. In 1932 a recommended range for minimum classroom illumination of 8 to 12 foot-candles was adopted as an "American Standard," as set forth in the bulletin, *Standards of School Lighting*, prepared under the joint sponsorship of the Illuminating Engineering Society and the American Institute of Architects. Today, it is possible to obtain as much as 50 foot-candles in the classroom practically and economically.

Because of this rapid advancement, the old school lighting standards have be-

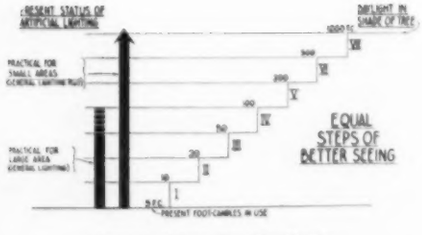
CONTROL OF LIGHT



photronic cell light-meter



recommended foot-candles for schools



seven steps to daylight

come obsolete and the "American Standard" bulletin is now in process of revision. Undoubtedly, the minimum foot-candle recommendations will be revised upward. The values for classroom lighting in all probability will be in the order of 10 to 20 foot-candles. For the more exacting eye work in sewing and drawing classes, 15 to 30 foot-candles may be recommended. For children with defective vision in "sight-saving" classes, higher values are desirable. For prolonged research, study, drafting, fine sewing or other close detailed work, supplementary lighting should be added to raise the illumination still higher. Such recommendations are indicated on the accompanying scale.

Quality of lighting: If foot-candles were the sole consideration, illumination could be obtained cheaply and easily with bare lamps or lamps in simple shades or reflectors. But this type of lighting is raw, harsh and glaring, for the light sources are concentrated in small brilliant spots. Small diffusing-glass enclosing globes increase the size of the light source and thereby decrease its brightness and glare. Still larger globes further decrease the annoying brightness without decreasing the illumination on the desk tops.

Most enclosing globes used in classrooms today are too small and consequently appear too brilliant. Where such globes are used in the schoolroom, it is recommended that the following sizes of glassware be employed:

Recommended Minimum Diameters of Enclosing Globes for Classrooms

150-watt lamp	14-inch globe
200-watt lamp	16-inch globe
300-watt lamp	18-inch globe

A still better quality of lighting can be obtained with totally-indirect or semi-indirect lighting fixtures. All or most of the light is reflected from the ceiling which becomes an extensive light source of relatively low brightness. As some of the light is absorbed by the ceiling, roughly 30% more wattage must be supplied than necessary with the enclosing globe system for the same illumination. However, the lighting is more comfortable, both direct and reflected glare are minimized and sharp shadows are eliminated.

Lighting layout: All too frequently the mistake is made of spacing the lighting fixtures too far apart. With a given mounting height, any fixture can light only a certain area effectively. With wide spacing of indirect lighting fixtures, the ceiling directly over the lighting units appears bright and the spaces between appear dim. This usually creates an uncomfortable glaring contrast which largely defeats the purpose of the lighting scheme.

A classroom with about a 12-foot ceiling height and of typical size, as shown in the plan on page 507, should be equipped with six lighting units. This layout is proper for rooms having the range of dimensions noted.

The table shows the average foot-candle values that can be expected from various sizes of lamps in direct lighting enclosing globes, or the average indirect fixtures, assuming a good white ceiling and medium light side walls. The values vary of course with the actual size of the room. These figures take into account reasonable depreciation and represent average lighting "in service." The initial illumination with new fixtures and lamps and freshly painted ceiling and walls will be somewhat higher. With any lighting system, careful maintenance is necessary to keep dust and dirt from wasting the light.

Wiring: One of the greatest obstacles to improved lighting in present school buildings is the inadequacy of the wiring provisions for carrying even slightly increased loads. In practically every branch of structural engineering and building planning, large safety factors are commonly used, yet in the matter of wiring it seems general practice to make little or no allowance for the greater loads which are almost inevitable.

A great many old and new wiring installations are even inadequate for efficient operation of the lighting load for which they are planned because the voltage drop in the wires causes the lamps to operate at less than their rated voltage. Lamps burned undervoltage produce light less efficiently. One cause of this lack of provision for proper voltage is that most architects and contractors use only the Underwriters' Codes as a guide in specifying wire sizes for given loads. Primarily these are safety codes and they do not take into account the length of the wire run and the voltage drop.

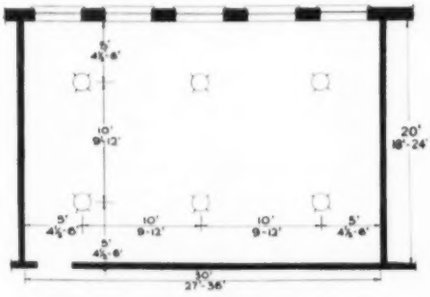
As a minimum consideration, the wire size and length of runs should be so planned that the voltage drop from panelboard to outlet will be no more than about 2% with the designed load. To provide for the future, this designed load should include a reasonable "safety factor."

Room surfaces: In the classroom the ceiling and upper side walls are as much a part of the lighting system as are the lighting fixtures. This is particularly true with indirect lighting.

In specifying the wall and ceiling finishes there are three considerations which are important from the standpoint of lighting:

(1) *The ceiling should reflect at least 70% of the light which strikes it.*

CONTROL OF LIGHT



layout for a well-lighted classroom

PROPER FIXTURES AND LAMPS AVERAGE FOOT-CANDLES OF ILLUMINATION

TYPE OF LIGHTING	SIZE OF LAMPS (WATTS)	ROOM DIMENSIONS 18' x 27'	20' x 30'	24' x 36'
Direct Lighting Enclosing Globes	200	11	9	6
	300	17	14	10
Indirect Lighting Fixtures	300	14	11	8
	500	24	19	15
	750	36	29	21
	1000	50	40	31

(2) *The walls should reflect about 50% of the light.*

(3) *Walls and ceilings always should be given a flat or matte finish.*

A good flat white paint on the ceiling will reflect at least 80% of the light initially. The higher the reflection factor, the more efficient will be the lighting. Sometimes ivory or cream is preferred from the standpoint of appearance. If this does not decrease the reflection below 70%, the illumination will not be seriously affected. There is no reason why a tinge of blue or green might not be added to the white if a cool effect is desired.

Acoustic ceilings usually absorb a considerable amount of light because of their porous nature. Where such sound-absorbing ceiling materials are used with an indirect lighting system, the illumination is generally decreased by as much as 25%. This can be compensated by using proportionately larger lamps in the lighting fixtures.

If the walls reflect more than 50% of the light, the brightness in the field of vision often becomes annoying. If they reflect much less than 50% some possible illumination and efficiency are sacrificed. The dado may be finished in a dark color, if desired, for this contributes little toward reflecting light on the desk tops.

Glossy or shiny finishes on walls, ceiling or trim are extremely bad from the standpoint of lighting and seeing. Contrary to general opinion, good flat or matte finishes generally do not depreciate much more rapidly nor are they much harder to keep clean than most glossy finishes. Shiny walls reflect uncomfortable glare from the window areas in the daytime. Glossy ceilings never appear evenly illuminated. Such a surface acts partly as a mirror reflecting images of the bright light sources and of the dark spaces between. The statement that a light-colored flat or matte finished ceiling should *always* be used with an indirect lighting installation has been made time and again by lighting authorities, and yet many architects, decorators, painters, and contractors apparently do not take it seriously. Probably more good indirect lighting installations have been spoiled because of shiny ceilings than for any other reason.

Wall colors: The question of what color to paint the walls is largely one of preference, involving decorative and psychological effects more than illumination. Tints of any color can be evolved to reflect 50% of the light. Warm tans and buffs seem to have become somewhat standard for schoolroom walls, but there are some excellent arguments in favor of using cool colors in preference to these. The cool greens, blue-greens and blues have a restful, quieting influence. They need not be depressing if the colors are carefully chosen. Schoolrooms generally are well heated in the wintertime, and they are certainly warm enough in the spring and fall, so there appears to be little need for supplying an additional warm effect for comfort. Warm colors make walls appear to press inward, while cool tones give an airy, spacious effect. Our eyes appear to prefer the predominant cool colors of natural daylight. Warm-colored walls tend to accentuate the excess of yellow and red rays from the incandescent lamp, whereas tints of blue or blue-green offset this to a great extent.

Daylight in the classroom: Daylight indoors on a bright day at the row of desks near the window is usually less than 1% of the light outdoors in the open. The reason for this is that, on a clear day, about 80% of the light in the open comes directly from the sun and about 20% from the sky; about one-twentieth of the sky dome is visible through the classroom windows, leaving only 1%, or about 100 foot-candles, available close to the windows. From this point, the illumination falls off rapidly across the classroom until only 5 foot-candles are available on the farthest row of desks. Where the school is situated on high ground with few trees or obstructions, the natural lighting may be somewhat better in classrooms with large windows, but daylight at the last row of desks rarely exceeds even 10 foot-candles. This unequal distribution handicaps the students in the rows away from the windows.

In most northern localities, about half of the schooldays are cloudy or dark. Then the indoor daylight falls much lower and seeing conditions become relatively poor throughout the whole room. When direct sunlight streams in, much higher illumination values are obtained, but the glare through the windows becomes unbearable; desks and books also reflect glare and the room is filled with sharply contrasting lights and shadows. Good translucent shades or some form of Venetian blinds, which again reduce the illumination, offer the only present means of controlling this condition.

Supplementing indoor daylight: As most classrooms are used largely for daytime work, arrangements should be made for controlling and distributing artificial light to supplement daylight when necessary. The diagrams on page 504 show how this can be accomplished by a simple control arrangement of a standard lighting system. The first diagram shows the distribution of natural daylight across a typical classroom on average bright, cloudy, and dark days. Let us assume that 20 foot-candles is the minimum illumination to be provided at any time. The

CONTROL OF LIGHT

most economical way to maintain this minimum level would be to distribute only enough artificial light at each point to raise the foot-candles to 20 and to supply as little light as possible where the daylight is above this value. As the second diagram shows, a simple control arrangement comes surprisingly close to balancing the daylight and meeting ideal requirements.

Balanced lighting: The wiring and switches should be arranged so that the row of lighting fixtures on the window side and the row on the inner side can be controlled independently. Since the daylight at the inner row of desks seldom if ever exceeds about 5 foot-candles, this inner row should be turned on continually when the room is in use. Assuming the use of indirect lighting fixtures for comfortable lighting and proper spacing of units as shown in the diagram on page 507, 500-watt lamps in this row of fixtures will balance the daylight quite evenly to slightly above 20 foot-candles on both bright days and average cloudy days.

On dark days the illumination near the windows would fall off. At such times the outer row of indirect fixtures should be turned on. The graph shows that 300-watt lamps in these units are sufficient to take care of usual dark day conditions and this lower wattage can be recommended here with good justification. However, as these lamps are used only a small part of the time, some schools may find it more convenient to use 500-watt lamps here as well, to take care of any night work or for the sake of simplification in lamp stocks and renewals.

Photo-cell control: It is impossible for a teacher or any other person to judge accurately when the light near the windows has decreased to below 20 foot-candles. The electric-eye can be used to control the outer row of fixtures and to turn on more artificial light when necessary, thus assuring good light for the students at all times and relieving the teacher of the responsibility. The photo-cell relay can be mounted on the wall above the blackboards and aimed to view the sky through the windows. This instrument connected to a contactor at the panel board can be adjusted to turn the lights on or off at specified foot-candle levels.

It is not necessary to use one of these photo-cells in every classroom, as one cell can control the lights in a whole group of rooms having the same daylight exposure. Unless there are trees or obstructions which shadow some of the rooms, four photo-cells usually can control the classroom lighting for an entire school building with reasonable accuracy. Within the past year, photo-call equipment has been somewhat improved and simplified with the result that more compact units are available at about half the price of comparable equipment on the market a year ago.

Control of daylight: Before the daytime lighting in a room can be called really comfortable, some measures generally must be taken to decrease the window brightness. Even on a cloudy day the sky brightness at the top of the window appears uncomfortable when viewed from across the room and the shades must be drawn part way down. Only on dark days can the shades be left up with comfort.

Windowless buildings greatly simplify the lighting problem. Additional reflecting areas are provided on the walls to help light the rooms. Switching control possibly may be simplified. Plenty of easily accessible space for wiring is made available by the ventilating ducts, and air conditioning outlets may be combined as part of the lighting fixture supports.

Glass buildings present some problems in lighting. Large areas of glass walls transmit some of the interior light rather than reflect it back into the room. This construction creates even more of a problem in direct sunlight control because of the large areas of Venetian blinds or shades necessary.

Window louvers: There is one other interesting possibility to which, apparently, little thought has been given. This is the development of some nonadjustable shielding arrangement to conceal the sky completely from normal view, while reflecting the outdoor light into the room in a direction away from the eyes of the occupants. Such an arrangement conceivably might be incorporated in glass walls or large window construction, or it might be attached to present high windows.

One way of accomplishing this might be through the use of horizontal fins resembling a Venetian blind, with the louvers set rigidly at varying angles to conceal the sky, but admitting as much light as possible. The upper surfaces of the fins might be of polished metal to direct light efficiently toward the ceiling. In classrooms where the pupils all face in one direction, vertical louvers set at an angle might be used to intercept light coming toward their eyes. A similar arrangement has been placed on the market and is being given a trial in some schools, as shown in the illustration.

It is not necessary for the louvers to extend the full length of the window since the bright sky generally is visible only above a point slightly higher than eye level. This leaves the lower part of the window unobstructed.



Delmo Sales Corp., San Francisco

window louvers — "Dalmo Litecontrol"

CONTROL OF LIGHT



This new instrument, the Luckiesh-Moss Visibility Meter, enables the experienced seeing specialist to rate accurately the relative difficulty of any seeing task and to prescribe illumination on this basis. While looking at the task through this device, graded light-obscuring filters are moved across the eye openings until the threshold of seeing is reached; at this point the relative visibility and recommended foot-candles of illumination are indicated on the dials.



blackboard lighting—Holophane fixture

Desks: Many educators very sensibly are advocating the use of desks with tilted easel tops which may be adjusted to a comfortable working position by the student, allowing him to sit up straight instead of bending over the task. By making a movable unit of this type desk with a seat attached, the pupil can turn the desk keeping his back to the bright light as the sun's position changes and the tilted easel top will pick up added illumination from the vertical window area. In supplying artificial lighting on these tilted desk tops it appears that some combination of diffused and directional light from above and behind the desk might be effective. When desks are movable, it is difficult to supply such lighting. If fixed daylight control devices, as suggested above, could be provided, the desks might be fastened in a permanent position and the artificial lighting problem would be simplified.

Blackboards: Some preliminary studies on the visibility of blackboard work show that, for students in the back of the room, this seeing task is considerably more difficult than reading a textbook. This indicates that several more times illumination is required on the blackboard than on the desk tops. The large wall area occupied by blackboards in the average classroom also affords somewhat of a handicap to good lighting and seeing conditions. The black areas absorb some of the light which might be reflected to the desks and the sharp contrast with the light walls directly in the field of vision is rather annoying to the eyes when viewed for a long time. To overcome this condition, the suggestion has been made to develop white or amber surfaces which could be written on with black chalk. This would aid in the room lighting, but the main idea seems to be to improve the visibility of the writing. Contrary to general opinion, laboratory researches indicate that writing in white on black is just as visible as black on white. It is doubtful, then, that this suggestion would aid much toward easy seeing.

In some schools, experiments have been made with light-colored window shades mounted above the boards to cover the dark surfaces when they are not in use. One thought which might be given consideration is to hinge the blackboards in sections so that they may be turned around exposing light-colored back surfaces. These may be used as bulletin or exhibit boards and reversed when the writing surface is required.

Lighting research: In the laboratories, scientists are making rapid strides toward the development of new light sources. Several forms of these new illuminants are on the market today, but it seems likely that their application in the school field may be somewhat restricted for a while, because they involve more complexities than does the incandescent lamp at the present time. However, new developments in incandescent lamps themselves and the use of new reflecting and diffusing materials now available may make possible the design of radically different forms of lighting equipment especially suited to meet the particular requirements of the school classroom. Thought is being given to this possibility.

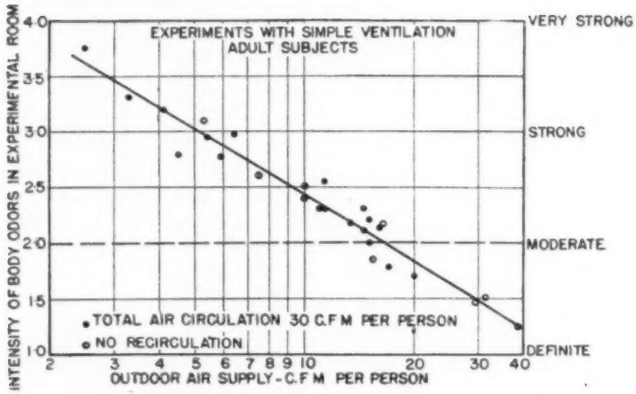
Prescribing light: Up to the present time, appraising the relative difficulty of various eye-tasks has been largely a matter of estimation, for there was no easy means of measurement. The recent development of the Luckiesh-Moss Visibility Meter makes it possible for the seeing specialists to measure accurately the relative visibility of any task and to prescribe the illumination necessary to meet a predetermined standard of seeing ease. With this instrument studies are being made of schoolroom tasks with a view to developing particular lighting to suit special requirements.

Specializing the classroom: At present the same classroom is generally used for lecture, study, demonstration, writing and recitation. These involve a variety of different seeing problems and it is difficult to plan one lighting system which will meet each of the different requirements equally well. Therefore the lighting must be a compromise attempting to meet the more difficult situations as well as possible.

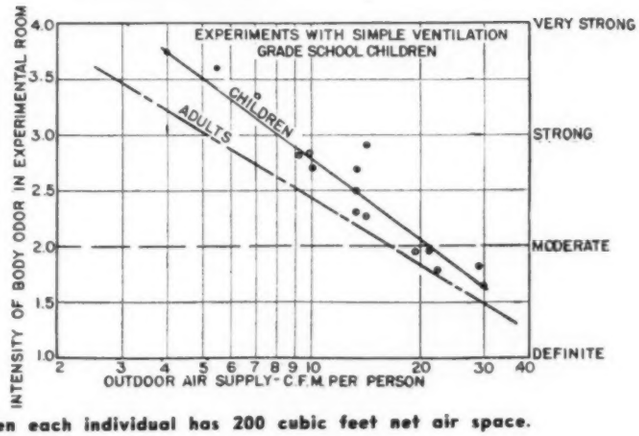
Some school authorities are beginning to advocate a revision of the educational system to permit each room to be used for a particular purpose. Certainly such a plan would make possible far more effective lighting. For example, in lecture and demonstration rooms a medium level of illumination at the seats would be sufficient for the easy task of taking notes, while plenty of light could be provided at the front of the room for easy seeing and concentration on the teacher and demonstration. Separately controlled lighting could be provided on blackboards and charts. Writing, study and workrooms might be so arranged that students could be placed in groups around desks or tables. This would permit supplementary lighting on the work in addition to medium general illumination. By this means much higher levels of illumination could be afforded on the task with little increase in operating cost.

A plan of this kind offers interesting possibilities from the standpoint of lighting. Very probably it would afford unusual architectural and design opportunities as well.

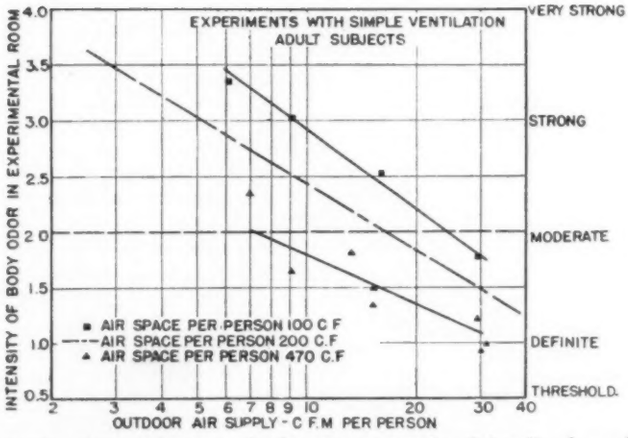
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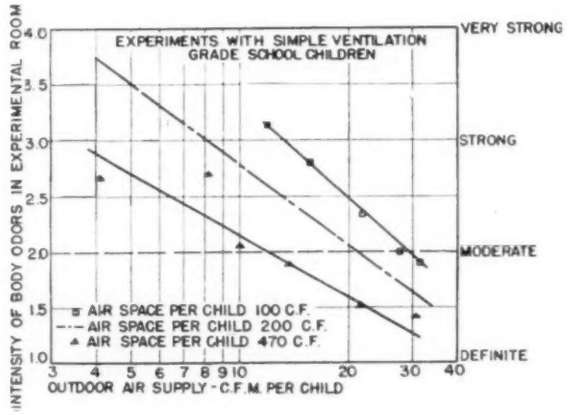


CHILDREN

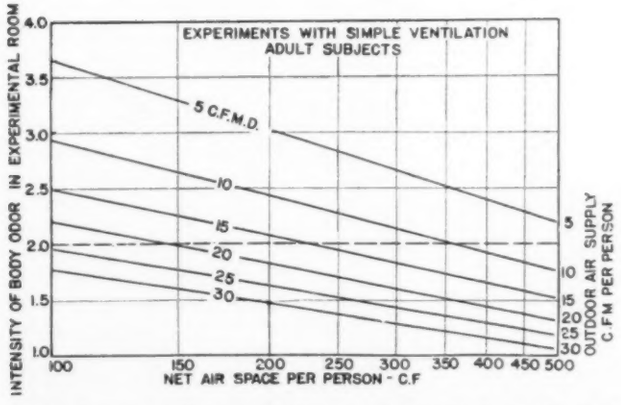


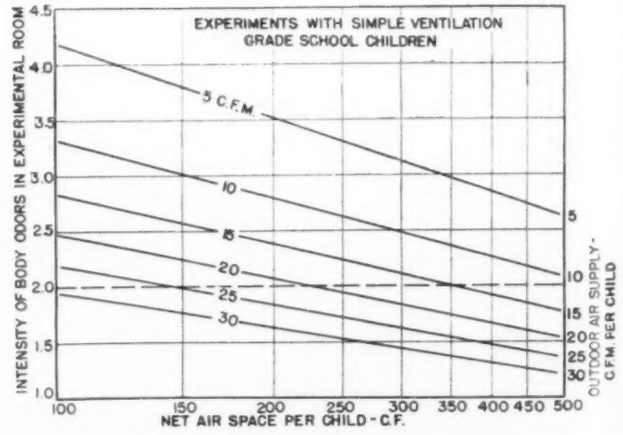
charts show relationship of outdoor air supply to odor intensity when each individual has 200 cubic feet net air space.





charts show influence of air space on odor intensity for adults and children.





charts for computing ventilation requirements from standpoint of body odor: for example, given an air space of 300 cubic feet for each person, follow vertical line indicating this condition until it intersects the broken horizontal line representing the allowable odor intensity of 2; by interpolation the required outdoor air supply is found to be 12 cfm for each adult, 17 cfm for each child.

ATMOSPHERIC CONTROL

The American Society of Heating and Ventilating Engineers has undertaken an investigation of odors and their relationship to minimum ventilation standards for health and comfort. A study of odor conditions resulting from reduced ventilation in classrooms was made by the A. S. H. V. E. Research Laboratory in Pittsburgh in connection with a study on classroom drafts and reported in a paper ("Classroom Odors With Reduced Outside Air Supply") by F. C. Houghten, H. H. Trimble, Carl Gutberlet and Merle F. Lichtenfels at the Society's semi-annual meeting in Toronto, June 1935. Further research is currently being conducted in cooperation with the Harvard School of Public Health; provisional findings were described in a progress report ("Ventilation Requirements") presented by C. P. Yaglou, E. C. Riley and P. I. Coggins at the Society's 42nd annual meeting in Chicago, January 1936. The accompanying paragraphs are based on facts and conclusions set forth in these two papers.

BETTER VENTILATION IN THE CLASSROOM

Air volume requirements for school ventilation probably have been the subject of more discussion than any other phase of heating and ventilation. The diversity of opinion can be seen in legal requirements: thirty States require 30 cubic feet of outside air per minute per pupil, and others require less or have no ventilation laws.

The engineer has advocated the circulation of a relatively large volume of air, whereas the medical man, knowing the harmlessness of carbon dioxide and the small oxygen content necessary to sustain life, has been unable to recognize a need for more than a very nominal amount of outside air.

Present researches have shown that recirculation of air within the classroom is as effective in providing the required motion and cooling power of the air as the supplying of outside air, provided the proper effective temperature of the recirculated air is maintained. This development has reopened the discussion concerning the required amount of outside air. Why should an outside air supply greater than that necessary to supply the minimum requirements for oxygen supply and carbon dioxide elimination be required?

Need for outside air: It is generally agreed that the requirement for oxygen supply and carbon dioxide elimination is no greater than 2 to 4 cfm per person. In conventional classrooms this will usually be supplied by infiltration and the initial volume of air in the room before occupancy. Based upon this reasoning, it seems logical to believe that no outside air need be supplied through the ventilating system, except when required to maintain the desired cooling power of the air. Recent research indicates, however, that when outside air is not required to maintain the cooling power, odors represent a limiting factor.

Sense of smell: The human nose when properly utilized affords a better criterion of the quality of air in occupied rooms than any of the known physical or chemical tests. In ordinary respiration, the course of air passing through the nasal cavity does not extend up high enough to strike the olfactory membrane, but the odoriferous particles reach the membrane by diffusion which gradually changes the air in the olfactory cleft. Sniffing appears to be the most effective and quickest way for the full perception of odors, as it directs the air stream upwards toward the olfactory areas. The sense of smell is normally aroused by inconceivably small concentrations of odoriferous substances. The sensitivity varies in different individuals. However, the olfactory organs are quickly and easily fatigued if the exciting stimulus continues, although they can perceive the sudden appearance of new odors. The occupants of a crowded and poorly ventilated room are not capable of recognizing body odors which are very apparent or even intolerable to a newcomer. Breathing fresh air restores the sensitivity.

Sources of odors: Odors in rooms come mostly from the occupants themselves. Odors from furniture and the like are not, as a rule, conspicuous in the presence of body odors, although they may be accentuated in a warm or moist atmosphere. The sources of body odors are numerous—foul breath, decaying teeth, sweat and sebaceous secretions (especially when personal hygiene is deficient), gases from the stomach and bowels, and decomposition of matter from the skin and clothes. Even healthy and clean persons freshly after a bath gave off in the experiments an appreciable amount of odor, which is apparently a normal waste product arising from metabolic processes and decomposition of matter in the skin and clothing. Such odors are not, as a rule, known to be harmful, but they certainly indicate a feeling of stuffiness and discomfort to any one coming from outside. The occupants themselves may not be conscious of the odor but they seem to be capable of detecting stuffiness or lack of freshness in the air.

TABLE 1: SENSORY INTENSITY SCALE OF BODY ODOR

ODOR INTENSITY INDEX	CHARACTERISTIC TERM	QUALIFICATION
0	None	No perceptible odor.
½	Threshold	Very faint, barely detectable by trained judges: usually imperceptible to untrained persons.
1	Definite	Readily detectable by all normal persons but not objectionable.
2	Moderate	Neither pleasant nor disagreeable. Little or no objection. Allowable limit in rooms.
3	Strong	Objectionable. Air regarded with disfavor.
4	Very strong	Forcible, disagreeable.
5	Overpowering	Nauseating.

ATMOSPHERIC CONTROL

In general, little attempt is made rigidly to enforce ventilation laws which require 30 cubic feet of outside air. Where recirculation is permissible a considerable percentage of return air is mixed with outside air after treatment. The Ventilation Standards of the American Society of Heating and Ventilating Engineers, adopted in 1932, require a minimum of 10 cubic feet of outside air per person provided that the relative humidity is between 30 and 60 per cent and that an effective temperature range between 64 and 69 degrees is maintained when heating and humidification is required and between 69 and 73 degrees when cooling or dehumidification is required. As architects and engineers will see from the accompanying report, it is necessary to specify school ventilation systems that will meet a wide range of conditions. Installations should be designed and operated so that as little as 10 cubic feet of outside air and as much as 30 cubic feet or more will be supplied to fit varying needs. It is also clearly demonstrated that the average requirement of 30 cubic feet or more of air per person in schools represents a fair average to meet normal conditions.

Measurement of odors: In order to get a good impression of ventilation conditions in a room, one should pass quickly from clean outdoor air to the room to be tested. One or two sniffs produce the strongest sensations of body odor, after which the sensation diminishes and soon ceases altogether. . . . The olfactory threshold—a barely detectable odor—is the baseline for measuring odor intensity; it is analogous to the threshold of hearing—a barely audible sound. On this unit of odor intensity is established the sensory intensity scale (see accompanying table). Standards for noise and sound have been determined by similar subjective tests, using the normal human air for criterion.

Air supply ratios: The strength of body odor perceived by the sense of smell on entering an occupied room from relatively clean air varies inversely as the logarithm of the outdoor air supply. In the Harvard experiments, it was observed, the body odor was very strong and disagreeable when the outdoor air supply per person was under 3 cfm, the strength decreasing arithmetically as the air supply increased logarithmically. The minimum air supply required to dilute the odor to the allowable intensity of 2 under the given conditions (200 cubic feet air space per person, no air conditioning) is about 16 cfm per person. With 30 cfm per person, the odor is still readily detectable but not objectionable. Recirculation does not seem to affect the odor strength appreciably. In other words, from the standpoint of body odor, a room can be ventilated just as well with an outdoor air supply of 16 cfm per person as with a total supply of 30 cfm, about half of which is recirculated.

The impossibility of fixing any single standard that would apply under all conditions is clearly evident. Each case must be considered separately.

Observations with children: Grade school children between 7 and 14 years old have apparently an equation of their own. In spite of smaller body surface and lower total metabolism, they give off more odor than the adults and the air requirement is therefore considerably greater. In tests on a group of children of average socio-economic status, the air supply had to be increased to 21 cfm per child. Adolescent boys and girls between the ages of 16 and 20 years yielded results closer to those of adults than those of grade school children.

Air space variations: The number of persons occupying a room appears to be a very important factor affecting odor intensity and air requirement. With 470 cubic feet of air space per person, which is more or less representative of conditions in homes, uncrowded offices, and the like, the air requirement from the standpoint of body odor was 7 cfm per person; with 200 cubic feet of air space, it was about 16 cfm per person, and with 100 cubic feet of air space, it was almost 25 cfm. Theoretically, doubling the air space is equivalent to doubling the air supply, as in both instances the concentration of odor should be reduced to half. Actually this is not quite the case, owing presumably to imperfect diffusion of odors and of the air supplied to the room. . . . For average children the requirements corresponding to the allowable odor intensity of 2 are 12, 21 and 29 cfm per child with, respectively, 470, 200 and 100 cubic feet air space.

Means of odor control: The usual methods of washing, humidifying or cooling recirculated air were found to remove a considerable amount of odor, thus making it possible to reduce the outdoor air supply. The surface cooler absorbed the least amount of odor and the dehumidifier the most. The absorption by the centrifugal humidifier was but only slightly greater than that of the surface cooler. The outdoor air requirement was correspondingly reduced from 16 cfm per person with simple ventilation to about 13 cfm per person when the mixture of outdoor and recirculated air was passed through the centrifugal humidifier or over the surface cooler, and to less than 4 cfm per person when the mixture was passed through the spray dehumidifier. In the last instance the odor intensity appears to be almost independent of the outdoor air supply.

Socio-economic factors: In a special series of experiments an attempt was made to study maximum variations from the average by using a limited number of subjects of the poorest and wealthiest classes. The requirements of school children were found to vary from 18 to 38 cfm per child, according to their class status. This reflected objectively on bathing habits. Once the minimum ventilation requirements are fixed for any given conditions, the problem of body-odor control resolves itself into personal factors of hygiene and sanitation. The ventilation engineer has no control upon these factors. Two baths a week would help a great deal in solving the schoolroom odor problem. Unfortunately, there are homes of poor families with no bathing facilities at all. A worthwhile experiment from the standpoint of both economy and education would be to have grade schools in the poorer districts provided with baths and in this way treat the real cause with, perhaps, less expenditure of money than would be the case with costly ventilation, which after all is temporarily corrective, not preventive.

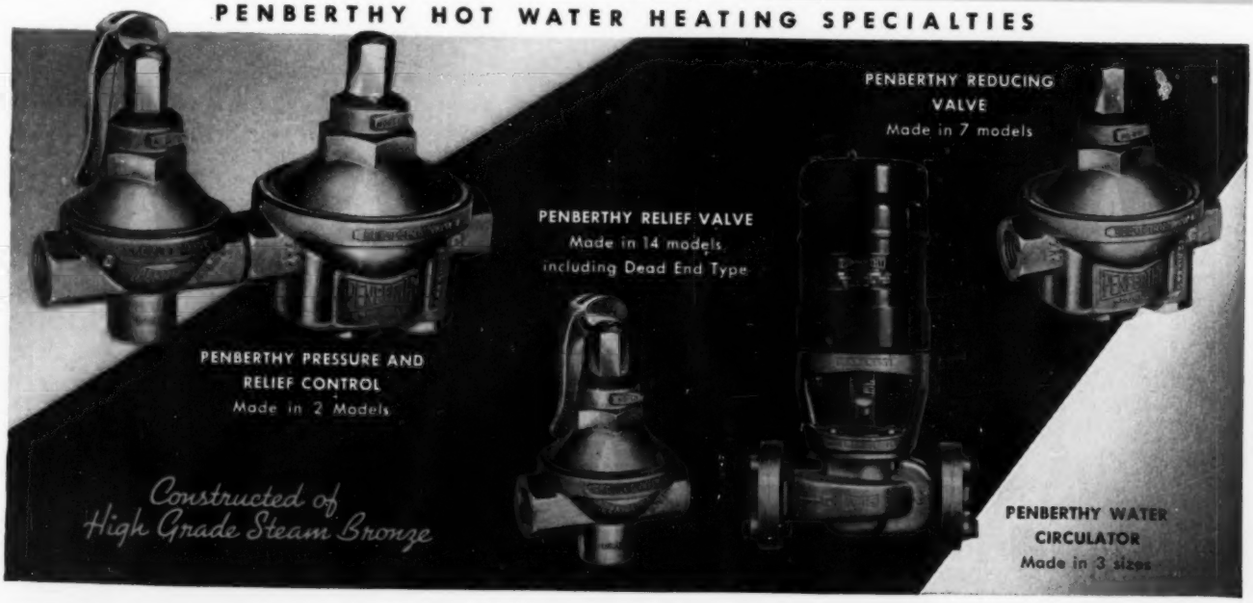


Thrifty

YOUR client gets a superior product at an attractive price when you specify one of the units shown above to keep his basement free from seepage water — or the specialties shown below to modernize his hot water heating plant. Thrifty clients particularly appreciate these thrifty products.

Penberthy Products are carried in stock by jobbers everywhere.

PENBERTHY HOT WATER HEATING SPECIALTIES



PENBERTHY INJECTOR COMPANY *Manufacturers of* QUALITY PRODUCTS *Since 1886*
DETROIT, MICHIGAN • *Canadian Plant,* Windsor, Ont.



Curtis luminaire

indirect luminaires

Designed by Walter Kantack. Produced by Curtis Lighting, Inc., 1123 W. Jackson Blvd., Chicago. (Sweet's Catalog File 28/14)

Design 154 in "L'Or-Ray" series is used with silvered bowl lamps. It is styled in Lunax aluminum. Two sizes are available: (1) 300-500 watt lamp, 36" suspension, and (2) 750-1,000 watt lamp, 42" suspension.

light-duty freight elevator

Produced by Otis Elevator Company, 260 Eleventh Ave., New York. (Sweet's Catalog File 30/8)

An external geared traction elevator machine has been designed for light freight duty. A large diameter extended worm shaft also carries the motor armature and brake pulley.



Fitzgibbons boiler-air conditioner

residence communicator

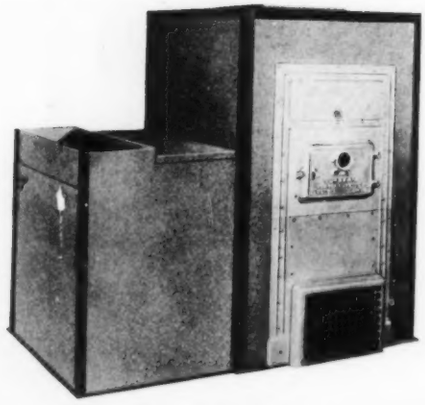
Announced by Bell Sound Systems, Inc. 61-63 East Goodale Street, Columbus, Ohio.

A new low-priced communicating system, known as "Belfone," provides a hook-up of several standard units which makes two-way communication with the butler, cook, chauffeur or gardener quite simple for the owner of a large house. By different combinations of the units various multiple station systems can be provided.

boiler—air conditioner

Introduced by Fitzgibbons Boiler Company, Inc., 101 Park Ave., New York. (Sweet's Catalog File 26/27)

This unit incorporates within a single compact assembly a steel oil-burning boiler (models for stoker and gas-firing are also available), an instantaneous domestic hot water coil for tankless operation, and an air conditioner providing clean, circulated, humidified and tempered air. The "Boiler-Air Conditioner" is of the split system type providing steam heat to radiators in strategically located points throughout the home, and conditioned air through ducts to those spaces where that type of convertible heat is desired. However, full capacity of the boiler may be devoted to heating by conditioned air if desired.



Fox air conditioner

air conditioner for small homes

Manufactured by The Fox Furnace Company, Elyria, Ohio. (Sweet's Catalog File 26/6)

A new "Sunbeam" unit heats, filters, humidifies, and circulates the air in winter and provides cooling ventilation in summer. It is equipped with a rotary wall flame type oil burner, ready to be connected to the oil and electric lines. One model is designed for installation above the basement: the return air ducts run under the floor and feed upward into the blower compartment.

automatic coal flow

Introduced by Iron Fireman Manufacturing Company, Cleveland and Portland, Oregon. (Sweet's Catalog File 26/41)

With this new machine, coal "flows" from bin to fire automatically. The operating mechanism housing is placed either behind or beside the furnace. The conveying screw can be laid under the basement floor. This leaves unobstructed floor space between furnace and bin, which may be inclosed and made dust-tight. Electric controls make the operation fully automatic.

laminated sheathing, stiff-lath

Two new products announced by The Celotex Corporation, 919 N. Michigan Ave., Chicago. (Sweet's Catalog File 13/16)

The laminated waterproofed sheathing is 1" thick, corresponding to standard wood sheathing. Compared to ½" sheathing: 50% more insulating value is provided at 25% more cost. The insulating "Stiff-Lath" provides a firmer plaster base without the use of supplementary gadgets.

stud partition plates

Produced by Adjustable Bearing Plate Co., 6625 Delmar Blvd., St. Louis.

Rigid steel bearing plates form a continuous support for joists and lock studs in place. They provide any desired stud spacing. Inverted, they tie studs to slab. Ducts and plumbing pass through the plates without necessitating any cutting.

new floor covering

Announced by Armstrong Cork Products Company, Lancaster, Pa. (Sweet's Catalog File 15/44) Price range: between that of felt-base floor covering and linoleum.

This new product, known as "Mastic Armoflor," consists of a calendered mastic mix on a backing of tough saturated felt. It can be installed on grade level concrete floors in direct contact with the ground, except where an excessive moisture condition exists. An extra-heavy wearing surface gives durability. The flooring is available in four colors—red, green, black, and brown. It is supplied in rolls 36 inches wide.

Sealex Linoleum

...the best seller as a library floor



Architect G. J. Cannon has created an individually-designed floor of Sealex Treadlite Tile for the Ponca City Library.

Architects who have carefully considered the particular floor-covering requirements for school, college and library buildings, are showing an ever-increasing preference for Sealex Linoleum. In these areas, where studious quiet is so important, the *resilient* surface of Sealex Linoleum helps to muffle distracting foot-traffic noises.

But that's only *one* of the reasons why so many architects specify Sealex Linoleum. Another is the *low first cost* of a Sealex Floor. Another is its lasting economy . . . proven longer life, with no upkeep expense save for occasional waxing. A final reason is the absolutely smooth surface of this modern floor-covering—highly sanitary and easy to keep spotlessly clean.

Installed by authorized contractors of Bonded Floors, Sealex Linoleum carries a guaranty bond covering the full value of materials and workmanship. Write for full information. CONGOLEUM-NAIRN INC., KEARNY, NEW JERSEY



In the Mansfield Public Library, a plain color Battleship Linoleum provides an ideal, quiet *library floor.*

SEALEX TRADEMARK REGISTERED *Linoleum Floors and Wall-Covering*

SOME FACTORS WHICH MAKE FOR BUILDING IMPROVEMENT

By L. SETH SCHNITMAN,

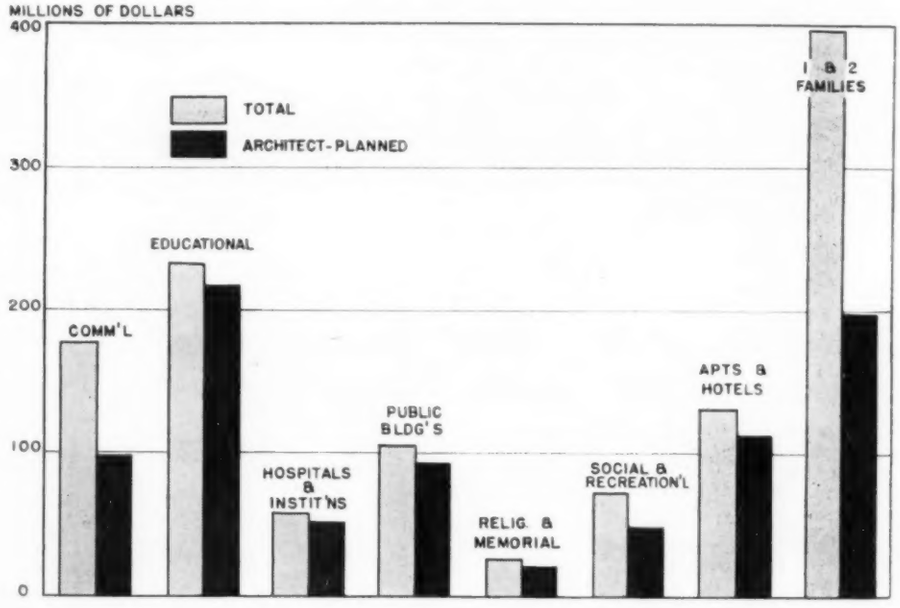
Chief Statistician, F. W. Dodge Corporation

That building operations are expanding is no longer news. However, the current series of charts should prove useful as a graphic review of the recent changes for the better. All present indications point to the probability that further substantial gains lie ahead. The building industry moves in broad cycles. Once having changed its general direction it continues on its new course for several years. The current directional change for the better will probably follow the general pattern of previous building cycles unless upset by unpredictable forces such as a war.

All construction figures used in the accompanying charts cover the 37 eastern states only.

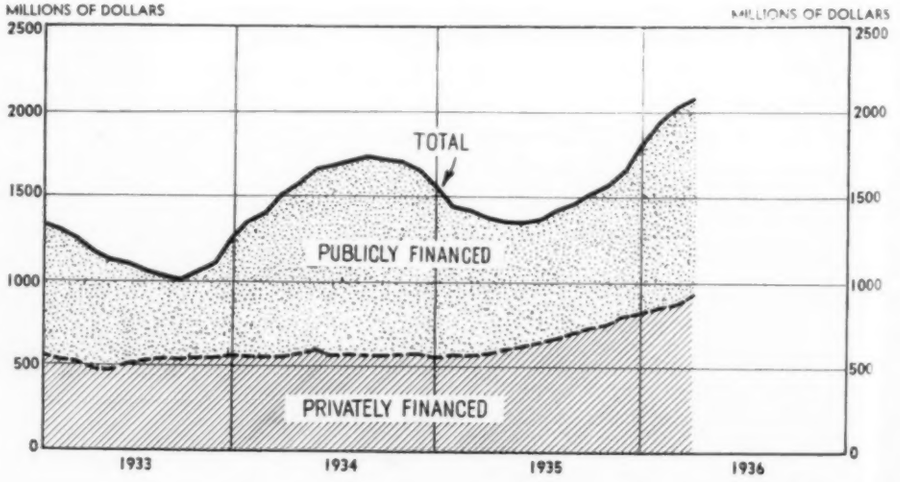
THE ARCHITECT FARES MUCH BETTER

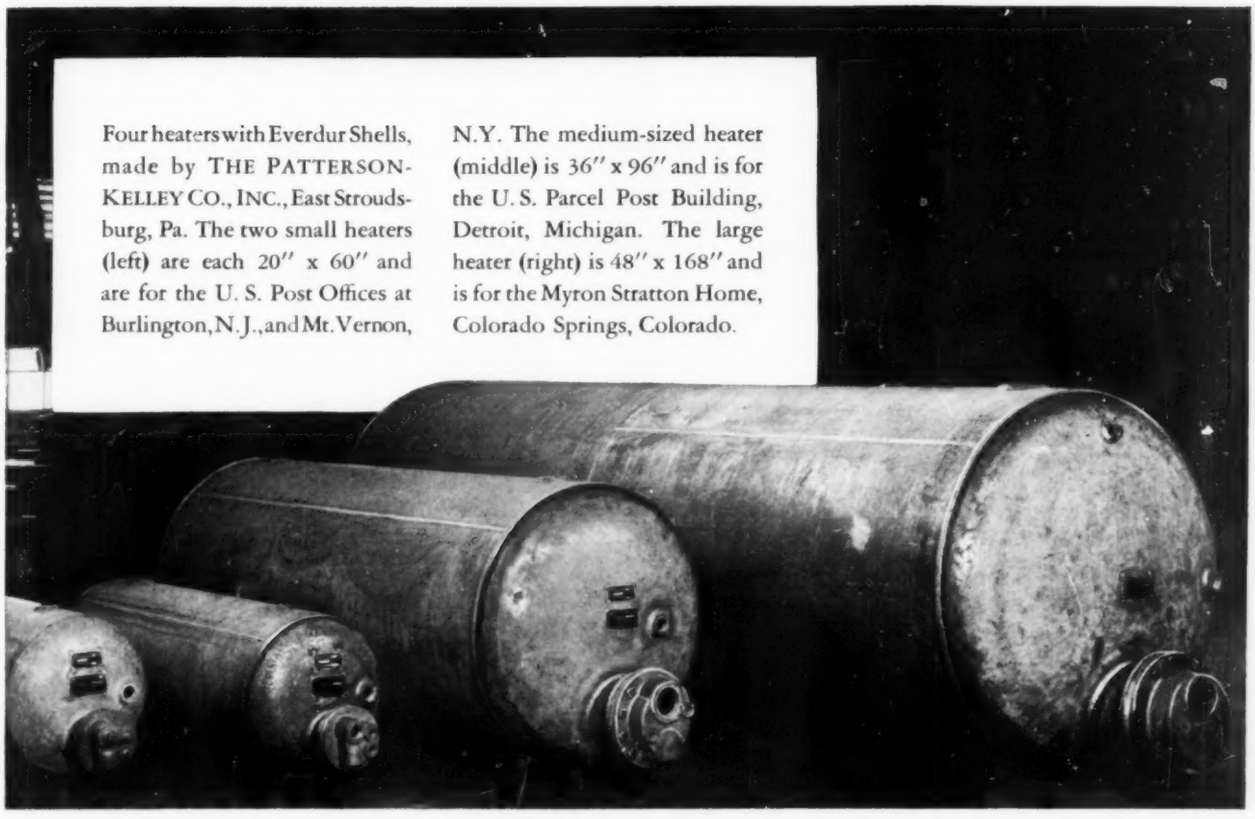
Building operations planned by architects are showing more pronounced improvement than is total building. During 1933 only 57 per cent of the total construction volume, excluding factories and civil engineering, was architect-planned. By 1935, the amount of architect-planned work had increased to about 68 per cent, while for the initial quarter of 1936 the proportion had grown to about 73.8 per cent. The accompanying chart gives graphic comparisons between totals and architect-planned work for the twelve months ended March 1936, for each of the eight major branches of building in which the architect exerts an important influence.



PRIVATE OPERATIONS GAIN STRIDE

To be in a healthy state the construction industry must derive its vigor predominantly from private projects as distinguished from public undertakings. Since February of this year the value of private construction projects has exceeded the total for public projects each month by growing amounts. Except for the four-month period, April-July 1935, and July 1934 we must go back to the days of 1933 before the inauguration of the PWA program to find such a condition. It is too early to state with certainty that the current ascendancy of private work over public projects will not suffer temporary reversal. It appears, however, that the present period may be marking what, at some future time, in describing the current construction cycle, will be considered as the definite turning point in the fortunes of private undertakings. The chart is based upon twelve month moving totals; i.e., each point plotted represents the total for the twelve months ended with the indicated month.





Four heaters with Everdur Shells, made by THE PATTERSON-KELLEY CO., INC., East Stroudsburg, Pa. The two small heaters (left) are each 20″ x 60″ and are for the U. S. Post Offices at Burlington, N. J., and Mt. Vernon, N.Y. The medium-sized heater (middle) is 36″ x 96″ and is for the U. S. Parcel Post Building, Detroit, Michigan. The large heater (right) is 48″ x 168″ and is for the Myron Stratton Home, Colorado Springs, Colorado.

NON-RUST STORAGE HEATERS OF

EVERDUR METAL . . . *Strengthened Copper*

reduce maintenance costs . . . assure rust-free water indefinitely

These four Patterson Combined Hot Water Service and Storage Heaters . . . all with solid Everdur shells . . . are destined for buildings in four different states. Proof again of the growing acceptance of Everdur as the ideal metal for non-rust water heater shells!

From small residential range boilers to giant storage heaters for hotels, laundries, hospitals, etc. . . thousands of Everdur tanks are giving rust-free, repair-free service—saving money for owners because Everdur *cannot* rust. This rugged copper-silicon alloy possesses remarkable corrosion-resistance, yet it has the strength of steel . . . and is readily welded by all usual methods. Our new publication E-10 contains complete information on Everdur Metal for tanks and heaters.

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Equally logical and satisfactory are many other uses for Everdur. Among them: air-conditioning equipment, masonry anchors, drains and ducts, electrical conduit. Additional data on any use of Everdur gladly sent on request.

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from mine to consumer

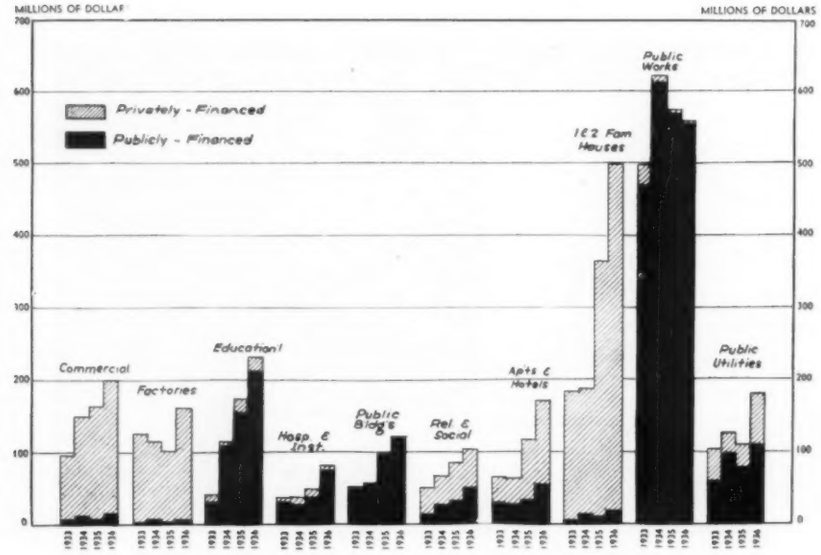
EVERDUR METAL
"Everdur" is a registered trade-mark identifying products of The American Brass Co. made from alloys of copper, silicon and other elements.

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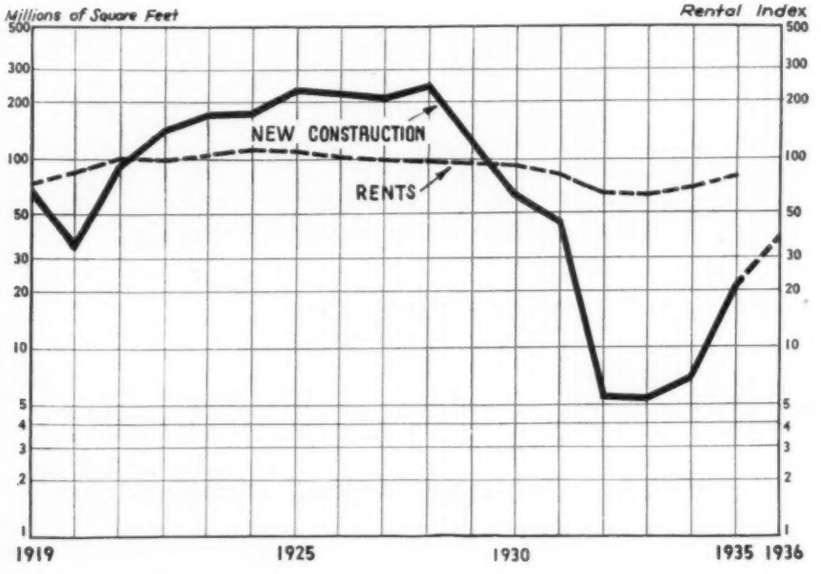
EVERDUR METAL *for* TANKS

RUSTLESS AS COPPER . . . STRONG AS STEEL



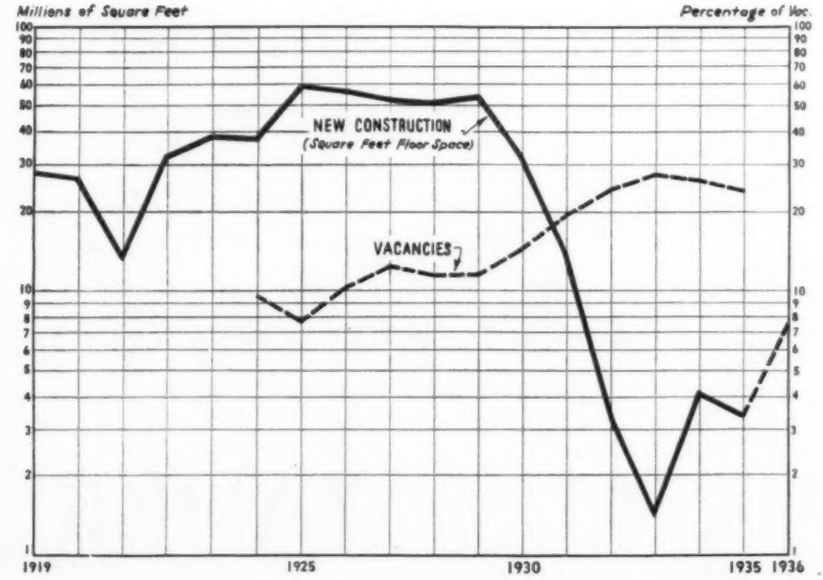
THE PUBLIC CONSTRUCTION BILL IS LARGE

Public money, to a greater or lesser extent, has found its way into every major structural type. Educational buildings, so-called public buildings, and public works account for the bulk of construction which customarily is publicly-financed. But even in types usually considered as distinctly of private character, such as warehouses, garages, canning factories, prison shops, naval plants, some public funds have always been employed. To date, however, taxpayers' money has not entered very heavily into the housing field. All bars for 1936 are estimates for the full year based upon known results for the first quarter. Bars for earlier years represent annual totals.



WATCH THE RENTAL CURVE

Rents have a profound bearing upon construction—especially of so-called investment building types. For purposes of illustration the current chart depicts the volume of new floor space involved in apartment house building since the beginning of 1919 as compared with the curve on rentals made available by the National Industrial Conference Board. The 1936 figure on new construction is an estimate for the full year based upon the record for the first quarter.



DECLINING VACANCIES SIGNAL IMPROVEMENT

As vacancies in existing buildings decline, the outlook for new private building ventures improves. To illustrate this fundamental fact, the trend of new office building construction has been charted against the vacancy index of office building space, as compiled by the National Association of Building Owners and Managers. The 1936 figure on new construction is an estimate for the full year based upon the record for the initial quarter.

Pepsodent Company Plant, Chicago

Genasco Trinidad Bonded 10-Year Built-up Roof. Architect: F. C. Foltz, Chicago... Roofing Contractors: Knauf & Weber Roofing Co., Chicago... General Contractors: Clearing Industrial Districts, Inc., Chicago.



Genasco

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STANDARD TRINIDAD
Built-up Roofing

it's "the tops" for good roofs!

For a really fine roof on a really fine industrial plant, the Pepsodent people selected a Genasco Standard Trinidad Built-up Roof.

Genasco Standard Trinidad Built-up Roofing is constructed with alternate layers of Genasco All-Rag Felts and Trinidad Lake Roofing Asphalt. Trinidad Lake Roofing Asphalt, the waterproofing factor of a Genasco Standard Trinidad Built-up Roof, has been used successfully for almost half a century. This material is stable and resistant to roofing's worst enemy—the ultra-violet rays of the sun. That's why Genasco gives such long service.

An interesting book—"For Your Roof"—will be sent if you send us the coupon below.

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Equipped Throughout by The John Van Range Co.

Cafeteria of World's Largest School Proves the Efficiency of

JOHN VAN RANGE EQUIPMENT

LANE Technical High School is probably the world's largest school entirely under one roof. Yet its modern cafeteria serves ample, appetizing and wholesome meals to a multitude of students and their instructors in a luncheon period no greater than that of schools of average size.

Beginning with the architect's plan, the kitchen engineers of The John Van Range Company designed all equipment for the commissary, kitchen and cafeteria. Under their supervision this equipment was manufactured in the great John Van Range factory and installed in record time, ready for the strenuous duty for which it was designed.

For three generations the leading architects of America have supplemented their own organizations with the services of John Van Range Kitchen Engineers when planning the food service departments of schools, colleges, dormitories, fraternity houses and other institutions. Acceptance of this service places them under no obligations and adds nothing to their costs.

Regardless of the size of your school, your problem is the same—to serve the best possible meals at lowest cost and in an unhurried and orderly manner. If you will send us your plans before construction is begun we will gladly assist in the layout. If your plans and specifications are complete we shall appreciate an opportunity to quote.

The John Van Range Co.

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In writing to manufacturers for any of the new catalogs or booklets listed in this column, mention of THE ARCHITECTURAL RECORD will be greatly appreciated.

STRUCTURAL MATERIALS AND PARTS

Brighten Walls at Low Cost with Texolite. United States Gypsum Company, 300 West Adams Street, Chicago, Ill.*

Rockwell Acoustical Plaster. Atlantic Gypsum Products Company, Inc., Acoustical Division, 205 East 42nd Street, New York.*

Marquette Concrete for Patching and Repairing Concrete. Marquette Cement Manufacturing Co., 33 West Grand Avenue, Chicago, Ill.

Thiokol Facts. Vol 1, No. 1. Published every other month by Thiokol Corporation, Yardville, N. J.

Metal Trim Catalog No. 100-B. Milcor Steel Company, South 41st and Burnham Streets, Milwaukee, Wis.*

Snap-On Mouldings. Pyramid Metals Company, 455 North Oakley Boulevard, Chicago, Ill.*

School Wardrobes . . . Unitfold Folding Wall. American Car and Foundry Company, 30 Church Street, New York.*

Welding and Cutting High Chromium Steels. The Linde Air Products Company, Unit of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York.*

Seamless Tubing. Bulletin No. 41. Parker Appliance Company, 17325 Euclid Avenue, Cleveland, Ohio.

Speed Control Equipment. Reeves Pulley Co., Columbus, Ind.

New Fire Line Pressure Reducing and Angle Valve. Elkhart Brass Mfg. Co., 1302 West Beardsley Avenue, Elkhart, Ind.*

Toncan Iron Pipe for Permanence. 4th ed. Republic Steel Corporation, Cleveland, Ohio.*

Horizontal Single Piston Pumps for General Services . . . Type AA . . . Type AC. Worthington Pump and Machinery Corporation, Harrison, N. J.

Facts for Users of A.C. Motors. The Lincoln Electric Co., Cleveland, Ohio.

TERMITE PROTECTION

Things You Ought to Know About Protection Against Termites and Decay. National Lumber and Creosoting Company, Inc., State National Bank Building, Texarkana, Ark.-Tex.*

They're Boring from Within! American Lumber and Treating Co., 37 West Van Buren Street, Chicago, Ill.*

LIGHTING

Baseball Lighting. Bulletin No. 2516. Crouse-Hinds Company, Syracuse, N. Y.

AIR CONDITIONING, HEATING, VENTILATING

G-E Automatic Heating with Oil . . . G-E Air Conditioning. General Electric Company, Air Conditioning Department, 5 Lawrence Street, Bloomfield, N. J.*

Coal Flow Burner. Iron Fireman Manufacturing Co., Portland, Ore.*

"Heat-an-Aire" Conditioner. May Oil Burner Corporation, Baltimore, Md.

The Sunbeam Oil Burning Air Conditioning Unit. The Fox Furnace Company, Division of American Radiator and Standard Sanitary Corporation, Elyria, Ohio.*

Superfex Oil Burning Air Conditioning Heating Plant. Perfection Stove Company, Cleveland, Ohio.*

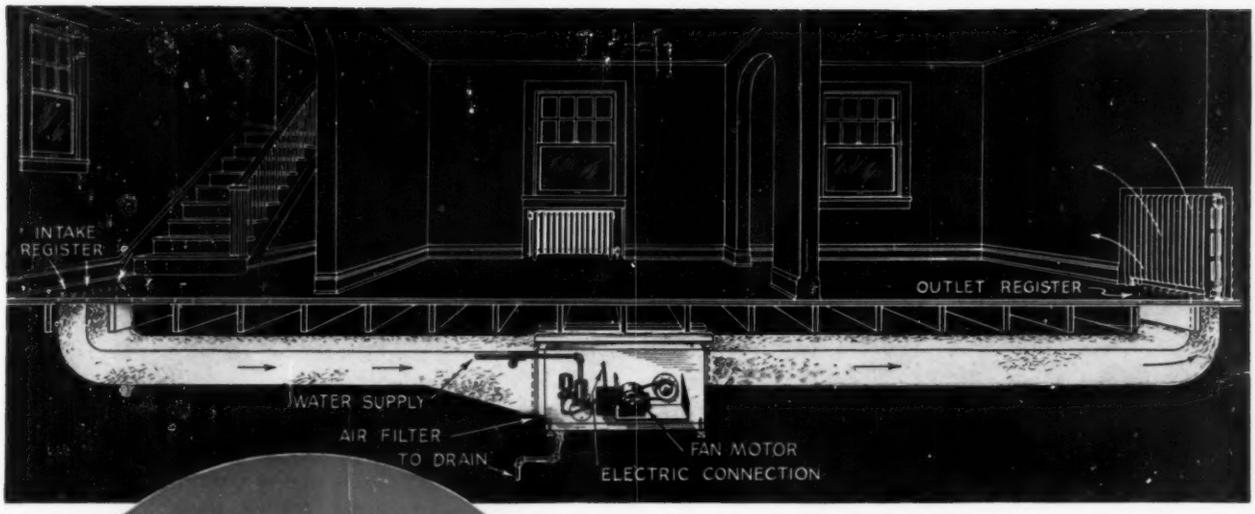
New Boiler-Air Conditioner Combined in a Single Compact Unit. Fitzgibbons Boiler Company, Inc., 101 Park Avenue, New York.*

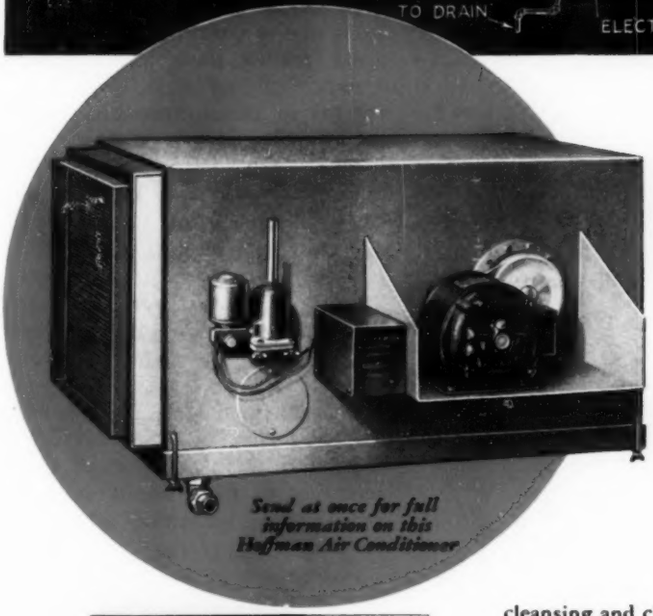
The Cellar Reborn. American Radiator and Standard Sanitary Corporation, 40 West 40th Street, New York.*

The Architect's Handbook of Heating . . . Air Conditioning All Year 'Round . . . Around the World with Oil-O-Matic . . . Colonial Virginia Steps Out of History. Williams Oil-O-Matic Heating Corporation, Bloomington, Ill.*

Residence Type R Boiler. Catalog No. 88 . . . Type C Boiler. Catalog No. 84. Kewanee Boiler Corporation, Kewanne, Ill.*

(Turn to page 49, adv.)





Now an AIR-CONDITIONER

DESIGNED ESPECIALLY FOR RADIATOR HEAT

. . . ENABLING YOU TO DESIGN A COMPLETE SYSTEM WITH ASSURED SATISFACTION TO THE OWNER

Here is the unit which gears radiator heat to the demand for air conditioning . . . designed by the makers of America's most complete line of fine steam heating specialties. The Hoffman Air Conditioner—installed and operated independently of the heating plant—provides the humidification, cleansing and circulation of air now considered necessary to ideal living conditions. In combination with either one or two-pipe Hoffman Radiator Heating Systems, the home owner is assured all the benefits of *true* air conditioning!





. . . INSTALLED WITH HOFFMAN CONTROLLED HEAT

This vapor-vacuum system furnishes ideal heating for a Hoffman Air Conditioner installation. It delivers to each room as much or as little heat as desired. A finger's touch upon the lever of the Hoffman Radiator Modulating Valve instantly increases or decreases the heat output of that radiator. Hence, fuel consumption is only in proportion to the demand for heat—a notable economy feature.

Hoffman Controlled Heat equipment is adaptable to any type of steam boiler and its cost is no greater than that of an ordinary two-pipe system.

. . . OR WITH A ONE-PIPE HOFFMAN VACUUM SYSTEM

For the home builder or modernizer whose budget is limited, there is no finer heating method than a one-pipe steam system equipped with Hoffman Vacuum Valves. The Double Air Locks of these valves are a guarantee of high vacuums and their Six Speed Venting feature means easy "balancing" of the system.

Low in original cost and amazingly economical in operation, this system offers many outstanding advantages. With a Hoffman Air Conditioner also installed, the most modern comforts are obtained at minimum expense.

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HOFFMAN CONTROLLED RADIATOR HEAT *with* AIR CONDITIONING

Sold everywhere by leading wholesalers of Heating and Plumbing equipment

MARKETING NEWS OF THE BUILDING INDUSTRY

traveling concrete art exhibit

The Portland Cement Association has a traveling exhibit of Color in Architecture with Concrete which includes samples of cast stone and ornaments of concrete in varieties of texture and color. Beginning its circuit in New York at the Hotel Roosevelt, May 26-27, the exhibit is scheduled as follows: June 2-4, Architects Building, Philadelphia; June 8-10, U. S. Chamber of Commerce Building, Washington, D. C.; June 16-17, Piedmont Hotel, Atlanta; June 25-26, Houston; July 1-3, Hotel Biltmore, Kansas City.

back-siphonage research

The Back-Siphonage Research Council has been organized to promote research study of cross connections and back-siphonage phenomena in plumbing systems.

Manufacturers, engineers and plumbing inspectors generally have been at a loss to meet the growing demands made on the industry for reliable methods of controlling the possible pollution of domestic water supplies through back-siphonage, and the Council has induced manufacturers and other groups to contribute funds to carry forward a research study by the National Bureau of Standards.

The direct need of such a study is recognized when one considers that requirements in most of the major cities of the United States are at a great variance, thereby necessitating a multiplicity of sizes, shapes and designs of various products in the stock of manufacturers. Most of the municipalities which have these requirements have not carried to a conclusion the research necessary to be certain that they are correct. The Health Department of the City of Chicago has recently ruled that the spout of all faucets must be at least ¾″ above the top of the fixture and many other cities have requirements varying from ¼″ to ¾″. It is such variances as these that the Back-Siphonage Research Council is attempting to have standardized on specifications technically sound and practical.

After the necessary research work has been completed and a practical standard is promulgated by the National Bureau of Standards, it is proposed that a reliable, central, independent laboratory be established to test, approve and certify for all cities equipment offered by manufacturers designed to control or prevent any and all phenomena of back-siphonage, thus eliminating the expense of duplicating such laboratories in the various cities.

air conditioning institute

John L. Fuller heating and air conditioning engineer, and F. E. Ritzenheim, branch manager of Gar Wood Industries, Inc., were elected president and vice president respectively of the newly formed Air Conditioning Institute at its first meeting held at the Seward Hotel, Detroit, on May 4.

The Institute is a non-profit corporation created to promote the use of air conditioning and to establish

(Turn to page 46 adv.)



Port Chester High School, Port Chester, N. Y.

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We invite questions about AIR CONDITIONING *from Architects*

WE BELIEVE tnat improvements which make living conditions better should be put into use as widely, and rapidly as possible. It seems to us that the acceptance of air conditioning, both for home and business, is being retarded by efforts to make it appear an abstruse subject.

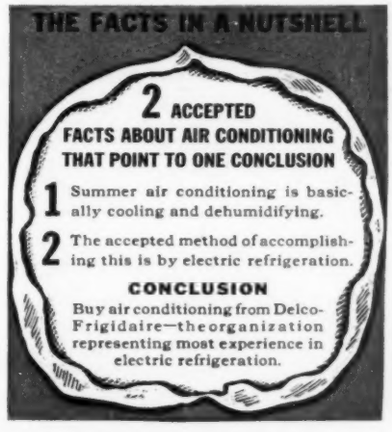
The distribution of air through ducts at speeds, and in quantities to meet various conditions, presents no great problem to you and your engineering associates. Given proper equipment, the control of the temperature, and humidity of such air currents is a simple matter.

The basis is electric refrigeration

Equipment is the basic factor. Summer air conditioning depends for its effectiveness on skill that has gone into the design, manufacture and application of the electric refrigeration equipment, *which makes the whole system possible.* Such air conditioning is basically taking the excess heat and moisture out of the air. The accepted method of doing this is by electric refrigeration. So we believe that when you consider air conditioning specifications you cannot do better than to look first of all for the leader in electric refrigeration. You do not have to look far. Delco-Frigidaire, with its General Motors background, represents such experience to an unparalleled degree.

We welcome opportunities to discuss air conditioning problems with architects. Neither in private conferences nor in talks with your clients do we ever attempt to create an atmosphere of mystery. Rather we say "the whole matter comes down to selecting equipment which is the outcome of the necessary experience, and then installing such equipment with the engineering skill which you expect from General Motors . . . world leader in precision manufacturing."

This attitude we believe serves the public interest. It encourages property owners to construct buildings which are truly modern, and to modernize old structures. When air conditioning problems are under consideration drop us a line, or phone our New York office (CIrcle 7-1367). Let's talk things over.

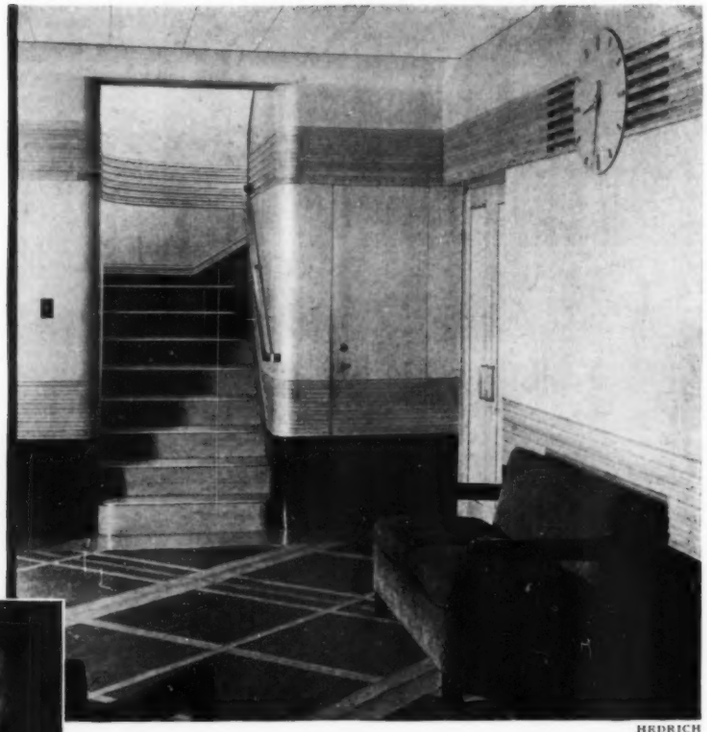


See Sweet's Catalog File (Section 26/7) for details on our air conditioning equipment. Write our headquarters in Dayton, Ohio, or phone our New York office at CIrcle 7-1367.

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AUTOMATIC HEATING **DAYTON, OHIO** *AIR CONDITIONING*

PRODUCTS OF GENERAL MOTORS





HEDRICH

RECEPTION ROOM, "WGN" STUDIOS, an addition to The Tribune Tower, Chicago . . . John M. Howells, Hood & Fouilhoux—associated architects, Leo J. Weissenborn—Chicago associate.

"First . . the 'WGN' Reception Room, then . . all corridors in the Studios"

Robert Carson, designer, Hood & Fouilhoux, says: "We wanted the richness of wood in this modern interior. Pale wood was needed as it was to be used as a reflecting surface to light the room. The treatment of curved corners of the room, the stair and the curve of the lighting cove was accomplished more simply and economically with Flexwood than would have been possible with wood in any other form.

"To reduce the variation in grain to a minimum, Oak Flexwood was bleached, then given a coat of colorless lacquer, making a continuous wall of very pale oak. Decorative bands are a series of oak moldings.

"When the room was finished, our clients were so well pleased that plans were changed and the same Flexwood treatment used for corridors throughout the Studios."

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ARCHITECT'S ANNOUNCEMENTS

Ralph Evans Hacker, of Hacker & Hacker, school architects, with offices at Fort Lee, N. J., has been appointed Architect to the Building Study of the Regents' Inquiry into the Character and Cost of Public Education in the State of New York. Owen D. Young is the Chairman of the Regents' Committee in charge of the Inquiry. Dr. Luther Gulick, Director of the New York Bureau of Municipal Research of Columbia University, is the Director of the Inquiry. Mr. Hacker is now engaged in studying various elementary and high schools and state colleges in the State of New York.

Joseph B. Wertz, registered architect in New Jersey, is now conducting his practice from Mayville, N.Y.

Alfred W. Grant and L. Livingston George have opened an office for the practice of architecture, under the firm name of Grant & George, at 44 East State Street, Westport, Conn. Mr. Grant was formerly located at 525 West Avenue Norwalk, Conn.

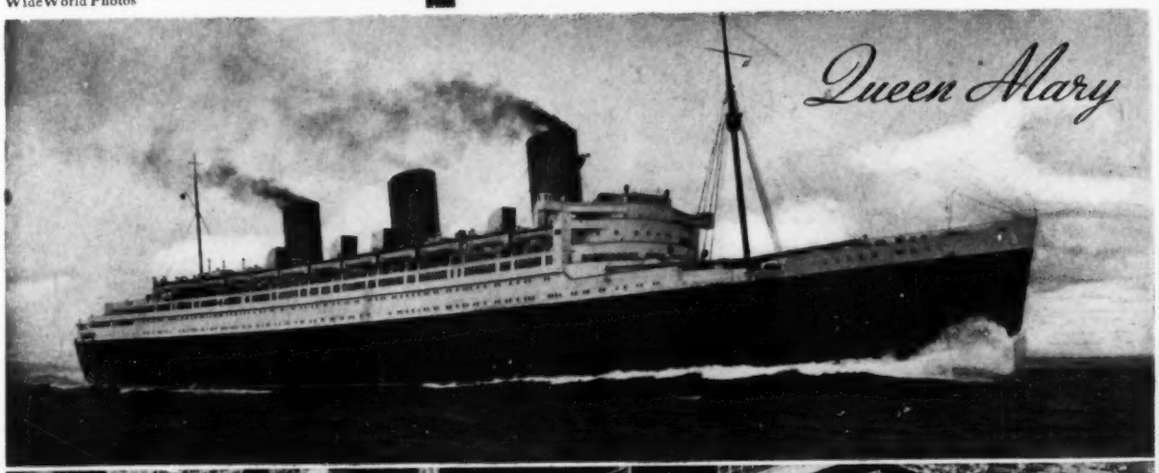
Paul Hyde Harbach and James William Kideney, architects, announce the removal of their offices to 505 Franklin Street, Buffalo, N. Y.

Alden de Hart has resigned his appointment as associate architect of the Procurement Division, Washington, D. C., to resume his practice of general architecture in Plainfield, N. J.

Correction: Peter Copeland, architect and industrial designer, has been appointed consultant by Marizon-Rosenberg of New York City. Mr. Copeland's offices and address remain at 244 West 23 Street; he is not a staff member at the Marizon-Rosenberg offices, as stated in the May issue of THE ARCHITECTURAL RECORD.

Full speed ahead to another Barrett Roof

WideWorld Photos





Fairchild Aerial Surveys, Inc.

Barrett ROOFS

Three huge new piers have been built in New York to accommodate "Normandie," "Queen Mary" and other superliners. Gen'l. Cont.: Pier 88, William Kennedy Construction Company, Brooklyn, N. Y. Gen'l. Cont.: Piers 90 and 92, George F. Driscoll Company, Brooklyn. Barrett Roofs applied by (Pier 88) Master Waterproofing and Roofing Corporation, and (Piers 90 and 92) New York Roofing Company, both of New York.

When the majestic Queen Mary docks at her American home, her passengers step ashore on New York's new Pier 90, under *another Barrett Roof*.

The regularity with which Barrett Roofs are selected for America's most news-worthy structures—its tallest skyscrapers, its greatest buildings, and its largest piers—is significant evidence of their unmatched value. They are recognized as the world's soundest investment in roof protection.

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A typical installation of Sanymetal Porcena Toilet Partitions and Sanymetal Porcena Shower Stalls with Porcena Wainscot Panels. • These installations consist of flush type insulated partition panels and wainscot panels porcelain enamelled on both sides. Doors are finished in plain baked enamel in a variety of colors or in imitation wood grain finishes. A detailed description of this installation illustrated will be supplied on request.

A UNION OF MODERNITY and SUITABILITY

is Presented in Sanymetal Porcena Toilet Partitions and Wainscot Panels

The first to originate and offer a definite style of toilet partition and wainscot panel utilizing porcelain enamelled panels, Sanymetal presents a wider scope for the creative talents of a patient profession and protects the building industry in the use of such materials by years of accumulated engineering and craftsmanship experience in the manufacture of certain exterior parts of porcelain enamelled metal.

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Unusual decorative effects are obtainable through the use of Porcena Wainscot Panels which leave no requirement of suitable wall protection unsatisfied. Sound mechanical construction embodied in Porcena (porcelain enamelled) Toilet Partitions insure faultless performance and fortify these units with a rich heritage of enduring quality. Qualified by a wide range of experience in adapting the uses of porcelain enamelled metal to building construction, Sanymetal's engineers and craftsmen have achieved heretofore unattainable combinations of designs and materials which establish new frontiers for toilet room environments.

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Dept. A6-8, 33 West Grand Avenue, Chicago, Illinois

Top Photo — *The New Brooklyn Technical High School, Brooklyn, New York.* Center — *The New Bayside High School, Bayside, Long Island, New York.* Lower Photo — *Bexley High School, Bexley, Columbus, Ohio.*





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A CONCEPT is without dimension. It is exactly as large as it is true. A concept may be as great, and as lasting, in minuscule as in monument ★ There is reason to suspect that the future will measure our modern architectural concepts by the intelligence of our use of today's materials, rather than by the artisanship of our adaptation of the massy materials of the ancients to modern building ★ Alcoa Aluminum is of today and for the future ★ Which is to say that its infinite variety of appearance gives full expression to the modern tempo, and that its durability and nobility are certain hostage to the future. The structural sufficiency and versatility of Alcoa Aluminum goes without saying ★ We forego actually labelling the building illustrated in order to stress the obvious fact that its real distinction is distinction. Aluminum Company of America, 2167 Gulf Building, Pittsburgh, Pennsylvania.

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PICK OUT any paint requirement you wish—and this is what you'll find: *The flat paint to use is the one made by combining Dutch Boy White-Lead with Dutch Boy Lead Mixing Oil!*

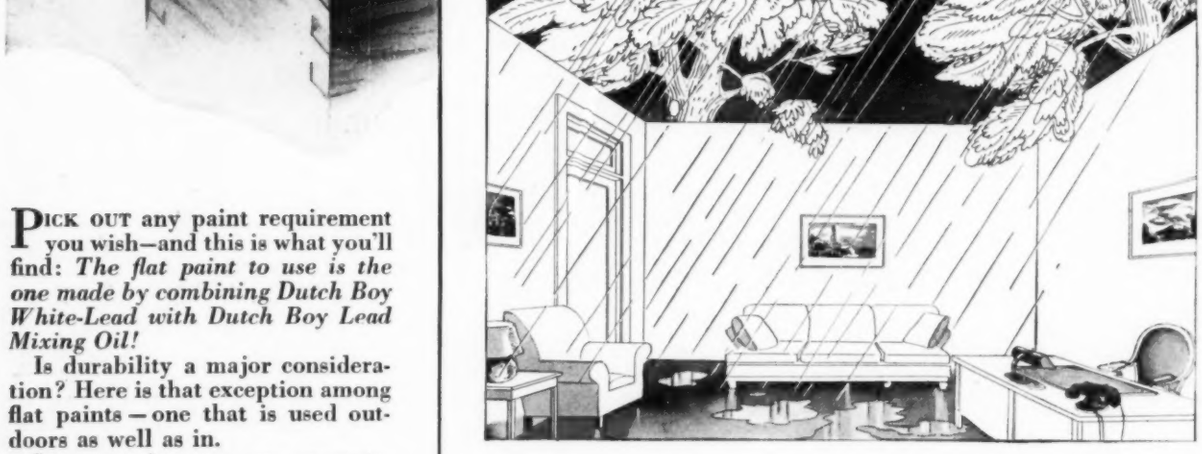
Is durability a major consideration? Here is that exception among flat paints—one that is used outdoors as well as in.

Its extensive use on concrete, stucco and brick exteriors is the best possible proof of its great durability. It takes all the punishment the elements can give, defying the weather year after year.

That sort of service outside gives you some idea of how it behaves inside—how it withstands wear and repeated washing. Also, it can be washed completely clean even after being ink-stained, pencil-marked, grease-smudged or defaced with shoe-blacking and mercurochrome.

You will find, too, that a white-lead and lead mixing oil finish has the richness, solidity *and depth* characteristic of lead paints. It is a finish beautiful enough for the finest interiors.

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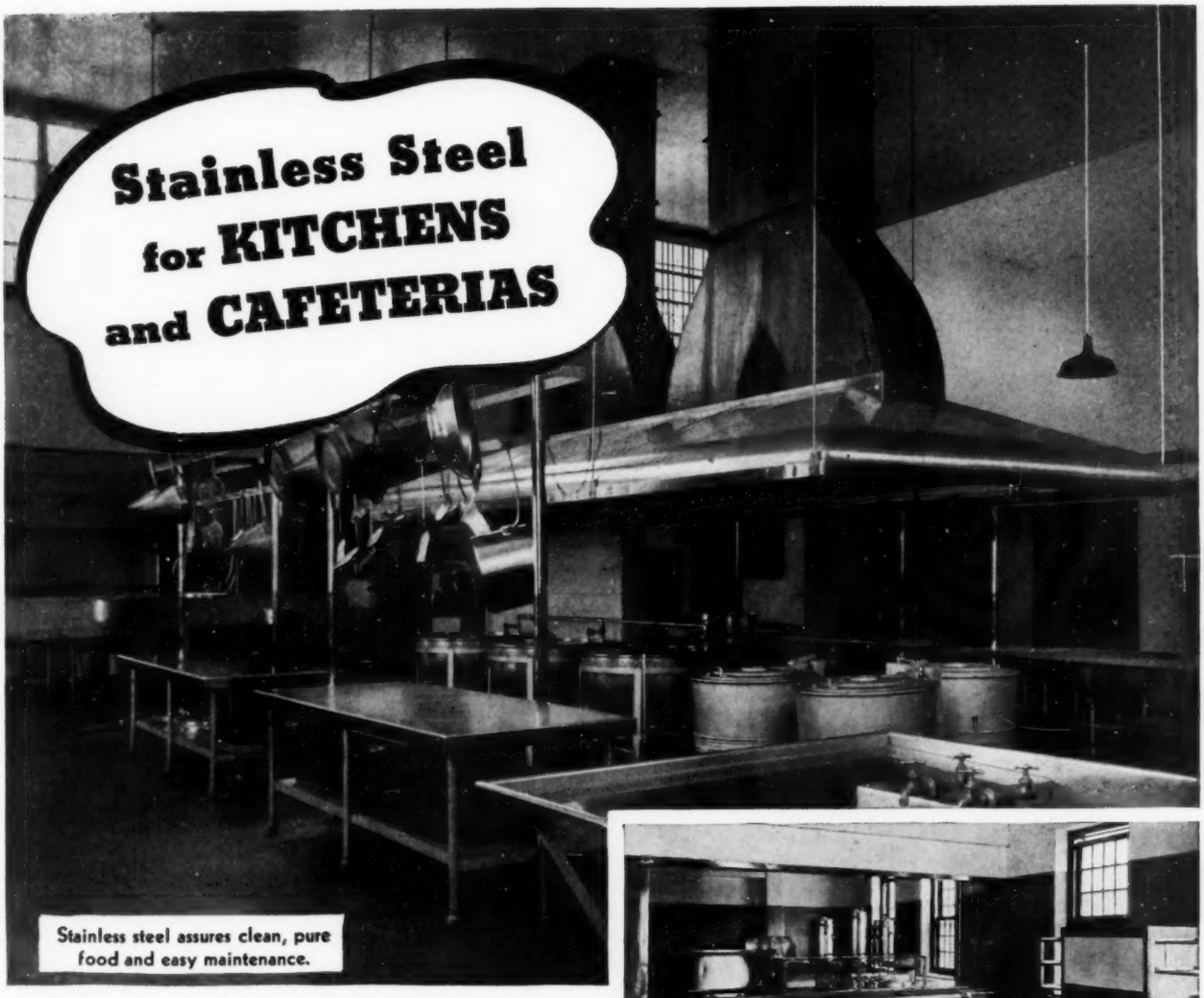
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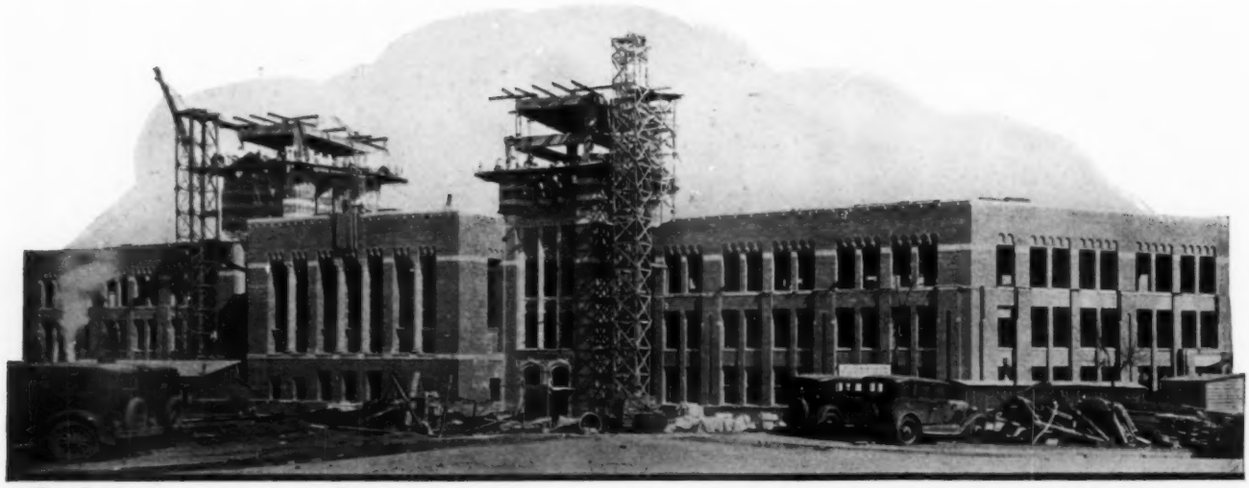
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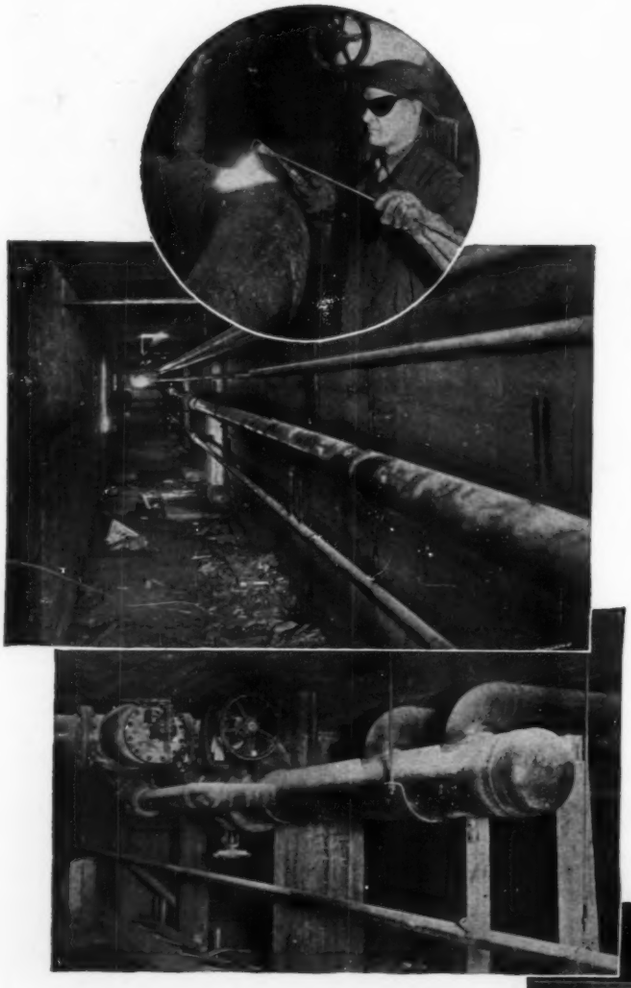
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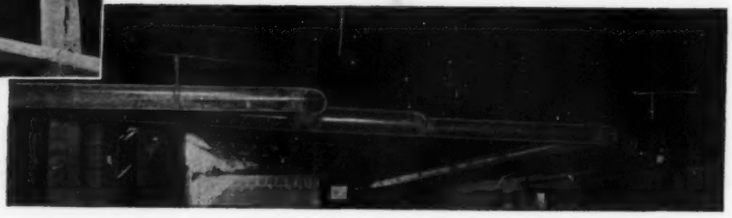
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At top: 2", 4", 6" steam lines in tunnel. Above: 14" distribution header with 8" and 10" branches. Right: 6" steam main in attic.

When completed, this Wyandotte High School, now being erected in Kansas City, Kansas, will take its place as one of the finest school buildings in the country, thoroughly modern in every respect.

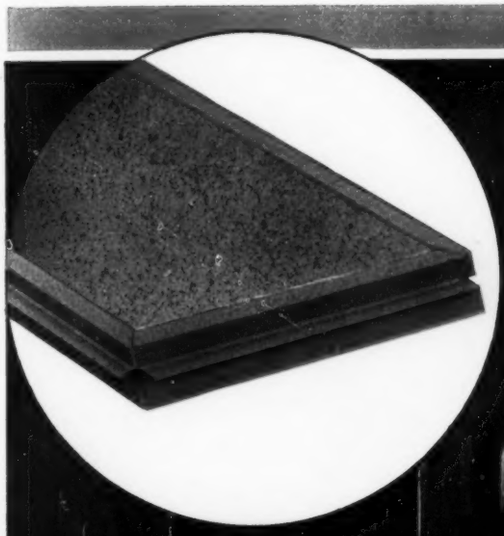
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Installation costs will be lower too, because the welding is being done throughout with AIRCO Oxygen, Acetylene, Welding Rods, and Welding Apparatus and Supplies. The Interstate Plumbing and Heating Company of Kansas City, Missouri, is the piping Contractor.

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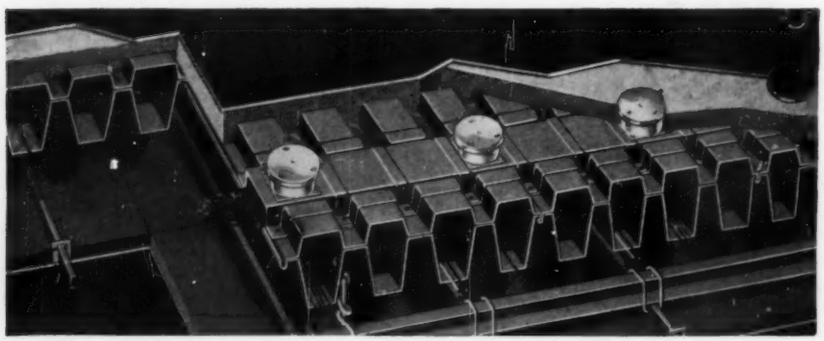
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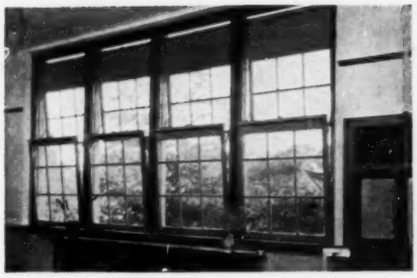
High School, Valley Stream, L. I.
Frederic P. Wiedersum—Archt.



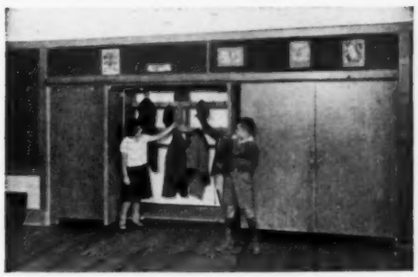
Port Chester High School, Port Chester, N. Y.
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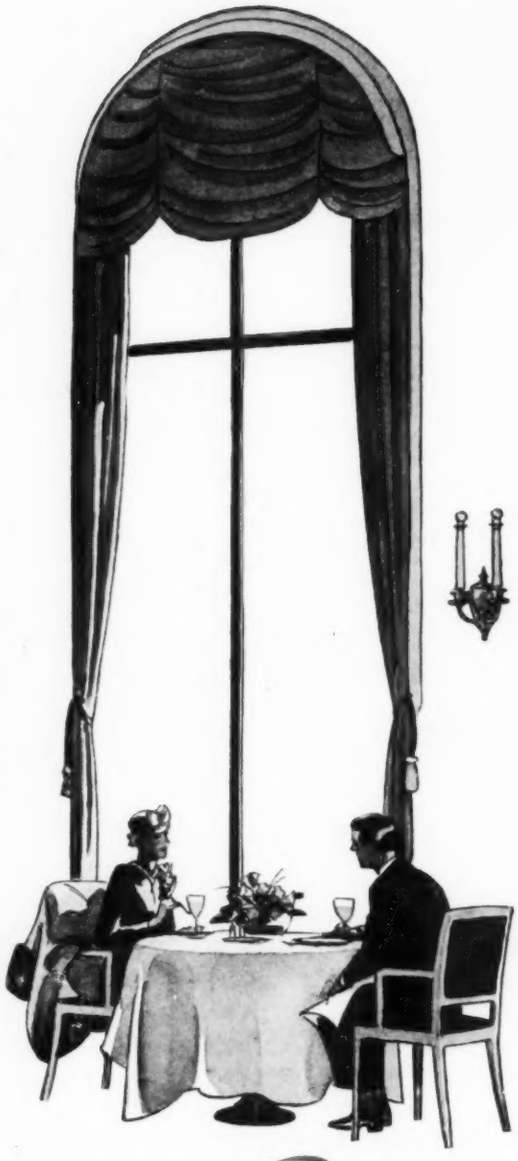
Theodore Roosevelt High School,
Washington, D. C.
A. L. Harris—Archt.

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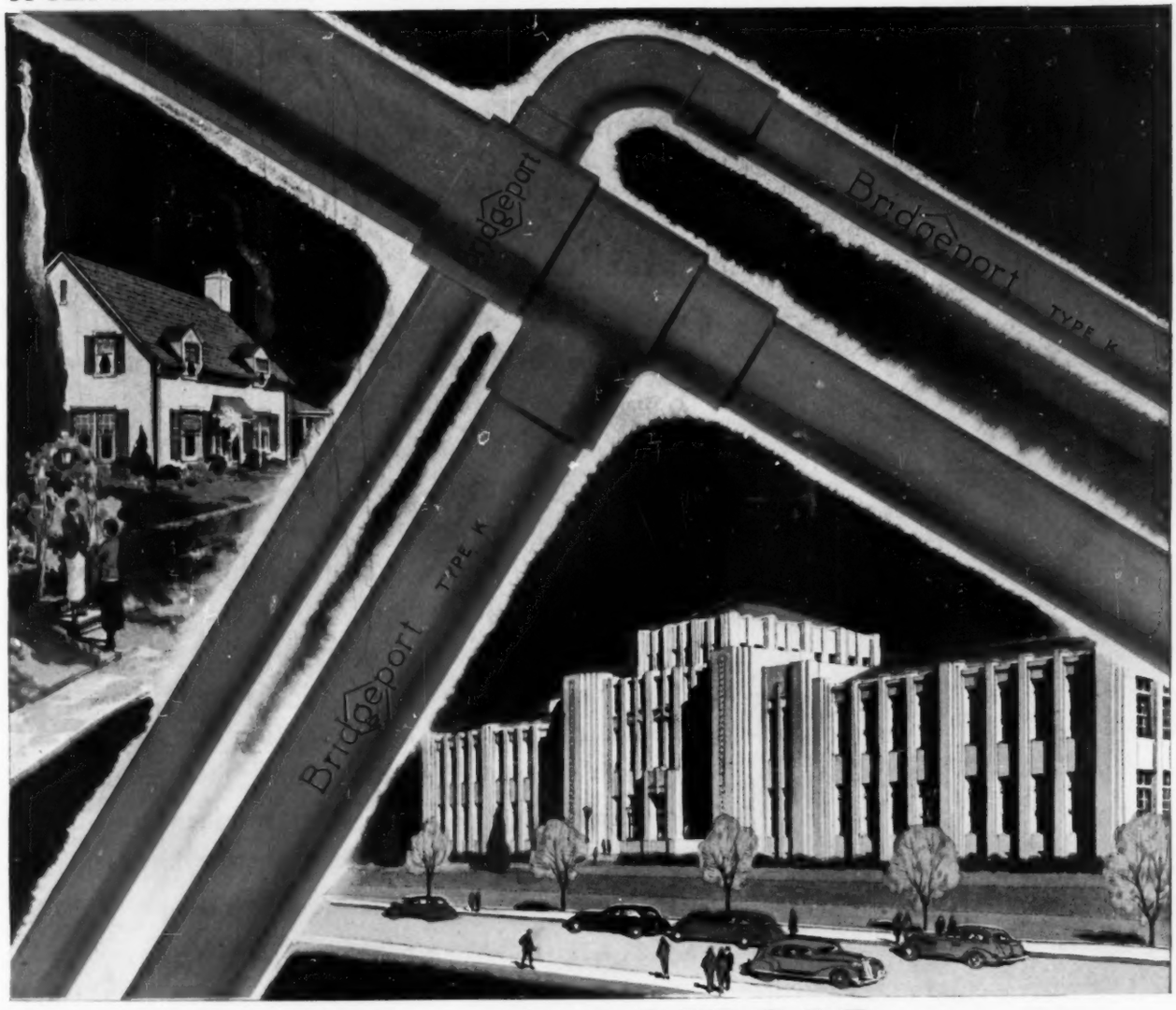


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Quality Glass

Libbey·Owens·Ford Glass Company, Toledo, Ohio manufactures a complete line of flat glass, including Flat Drawn Window Glass... Polished Plate Glass, both plain and colored... Heavy Sheet Glass... Greenhouse Glass... Safety Glass... Tuf-Flex tempered plate glass... Vitrolite opaque structural glass . Aklo heat absorbing glass... and distributes the Figured and Wire Glass manufactured by the Blue Ridge Glass Corporation of Kingsport . . . Tennessee.

INEXPENSIVE FOR EVERY TYPE OF BUILDING



Economical, Free-flowing, Leak-proof
hot and cold water lines, heating lines, underground service, air-conditioning, refrigeration, fuel-oil and sprinkler piping.

BRIDGEPORT COPPER WATER TUBE AND FITTINGS

FALSE economy has often led to the use of rustable piping in last-minute efforts to keep within building budgets. Schools, homes, apartment houses and industrial buildings frequently face heavy replacement expense because of this mistaken idea.

Now, with installations of copper water tube and wrought copper fittings comparable to rustable piping in cost, and far exceeding it in permanence . . . the fallacy of such procedure is clear.

Architects and engineers are now specifying Bridgeport Copper Water Tube and Soldered Fittings for all types of buildings. Hot and cold water lines are but one of many applications. Copper is not too costly for steam and hot water heating lines. Owners are saving money through the many advantages of these rust-proof, easy-to-install materials.

Have you the Bridgeport Copper Water Tube booklet? A line to us will bring a copy.

BRIDGEPORT BRASS COMPANY
BRIDGEPORT, CONN. · ESTABLISHED 1865

"Bridgeport" TRADE MARK

BRIDGEPORT



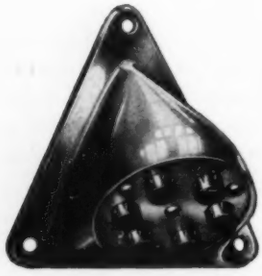
K-3395—Speakman Anystream Self-Cleaning Shower Head with lever handle control. ½" size. With ball joint. (Patented Jan. 2, 1923 & Nov. 3, 1931)



K-3396—Speakman Anystream Self-Cleaning Shower Head with lockshield arranged to operate by a key.



K-7047—Speakman Adjusta-Spray Head with integral balljoint. (Patented Nov. 3, 1931, March 15, 1932 & June 14, 1932)



K-3399—Speakman Wall Type Anystream Self-Cleaning Shower Head.

Have You a Shower Problem?

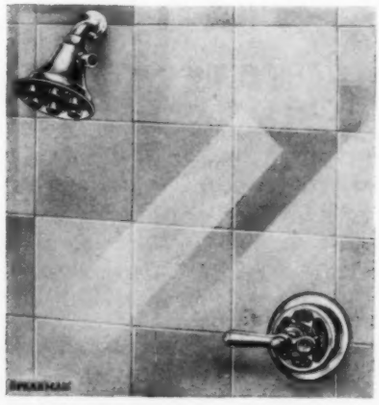
THE SOLUTION CAN BE FOUND IN THE SPEAKMAN LINE

THE wide variety of showers and shower heads available in the Speakman Line assures you of finding exactly the type you need for any particular installation. Speakman showers are modern, practical and economical. By means of new features and new designs we are constantly adding to the convenience and enjoyment of the bather. All Speakman showers are finished in sparkling chromium plate which will never tarnish. So for any type of installation, large or small, look first at the Speakman Line, and make your choice from this most modern and complete line of showers and shower heads.

Refer to Sweet's Catalogs, Section 25, Catalog 9

SPEAKMAN COMPANY · Wilmington, Del.

Quality Fixtures since 1869



K-3100 — Speakman Built-in Mixometer Shower with Anystream Self-Cleaning Head with lockshield control.

K-3105 — Same as K-3100 but with Hi-seat valves with unions.



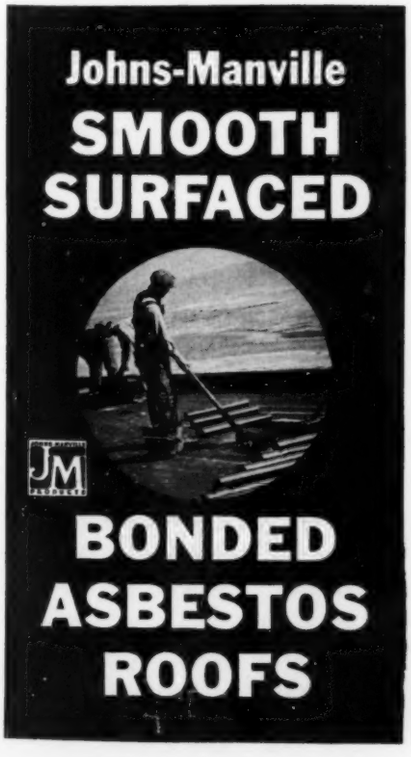
K-3315 — Speakman Columbia shower.

K-3310—Same as K-3315 but with Mixometer with cast wall lugs and metal lever handle.

Speakman **SHOWERS AND FIXTURES**



Applied in 1912—this J-M Roof still in prime condition as stands at Navin Field, Detroit, give way to larger structures



TIME and weather play no favorites. The roof you specify for your clients' buildings will face the same destructive elements as the roof over a baseball park.

Consequently, there is a message of value for you in the service record of the J-M Roof shown above. Last fall the stands at Navin Field, home of the Detroit "Tigers," were taken down to make way for larger structures (and another J-M Roof). But the original J-M Smooth-Surfaced Asbestos Roof—applied in 1912—was still in excellent condition!

And in every type of service, the story is the same. The "honor roll" below gives only a partial list of the many J-M Asbestos Roofs still in excellent condition as they near or pass the 25-year mark.

The reason? They were built up of felts made of ASBESTOS . . . the fireproof, rotproof, PERMANENT MINERAL.

Asbestos Fibres are solid, non-capillary by nature. Hence, J-M Roofing Felts form a *positive barrier* against evaporation of the lighter oils in the asphalt, preserving their waterproofing qualities indefinitely *despite* the intense drying-out action of the sun. Thus, minimum maintenance is assured on J-M Asbestos Roofs throughout their long lives.

FREE—"Facts about Built-Up Roofs"—a handbook giving data on roofing problems and complete information on all J-M Roofs. Answers construction and flashing problems. Tells how roof insulation saves money on fuel and air-conditioning costs; protects roofs from damage caused by contraction and expansion. For your free copy, write to Johns-Manville, 22 E. 40th Street, New York City.

Partial Honor Roll of J-M Roofs still in Prime Condition after more than 20 Years of Service

22 YEARS old at Seattle, Wash. (Port of Seattle, Bell St. Dock)

36 YEARS old at Newark, N. J. (General Leather Co., Bldg. No. 4)

23 YEARS old at Chicago, Ill. (Reid, Murdock & Company)

25 YEARS old at Cincinnati, Ohio (American Valve & Meter Co.)

24 YEARS old at Louisville, Ky. (American Medicinal Spirits Co.)

23 YEARS old at Bluefield, West Va. (Huff, Andrews & Thomas Co.)

26 YEARS old at Beech Grove, Ind. (Big Four Railroad Shops)

23 YEARS old at Chicago, Ill. (Sears, Roebuck & Co., Grocery Bldg.)

Build for Permanency

WITH REVERE COPPER AND BRASS

Flashing To solve drainage and seepage problems in the masonry walls of modern school buildings, architects have long specified Cheney's *scientific* through-wall copper flashing. This flashing assures permanent protection from the leaks, streaks and stains which mar the appearance of a building. Also, it prevents rusting of steel spandrels and lintels. Both the Cheney Flashing and the patented Revere Thru-Wall Flashing are now available through Revere distributors.

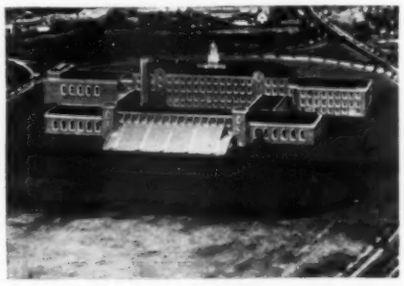


Cornell University Medical College, New York City
CHENEY FLASHING

AMHERST COLLEGE
BUCKNELL UNIV.
COLUMBIA UNIVERSITY
DARTMOUTH COLLEGE
EXETER ACADEMY
GEORGETOWN UNIVERSITY
HARVARD COLLEGE
JULLIARD SCHOOL
LAWRENCEVILLE SCHOOL
PRINCETON UNIVERSITY
U OF PITTSBURGH
YALE COLLEGE

☆

Piping An increasing number of schools and colleges are choosing Revere Copper Tube for underground water service, hot and cold water lines, fuel oil lines, and heating lines. This tube is joined with trim and leak-proof Streamline soldered Fittings, or compression fittings. These copper tube installations are actually competitive in price with those of rustable metals. Also popular for long-lasting installations are Revere Brass Pipe and Revere Red-Brass Pipe.



Shaker Heights High School, Shaker Heights, Ohio
REVERE BRASS PIPE

AUBURN, N. Y., H. S.
CINCINNATI UNIVERSITY
CORNELL UNIVERSITY
HYDE PARK, MASS., SCHOOL
LOUISVILLE UNIVERSITY
NEWARK, N. J., H. S.
NORTHWESTERN U
ROME, N. Y., STATE SCHOOL
ST. LOUIS, STANLEY HALL
U OF MICHIGAN
U. S. MILITARY ACADEMY
WEST NEWTON, MASS., H. S.

☆

Roofing Educational institutions have found that Revere Sheet Copper is permanent, workable and economical. It is *the* weather-tested and time-proven material for roofings, flashings, gutters, downspouts, valleys, and other sheet metal applications. Also remember Revere Leadtex (lead-coated sheet copper). Leadtex has all the advantages of sheet copper . . . light weight, workability, economy. In addition, it has the mellow color, the weathering and non-staining qualities of lead.



Dunster House—Harvard College, Cambridge, Massachusetts
REVERE SHEET COPPER

ATLANTA UNIVERSITY
COLUMBIA UNIVERSITY
LOYOLA UNIVERSITY
M. I. T.
RADCLIFFE COLLEGE
U OF CALIFORNIA
U OF FLORIDA
U OF WASHINGTON
VASSAR COLLEGE
WELLESLEY COLLEGE
U. S. NAVAL ACADEMY

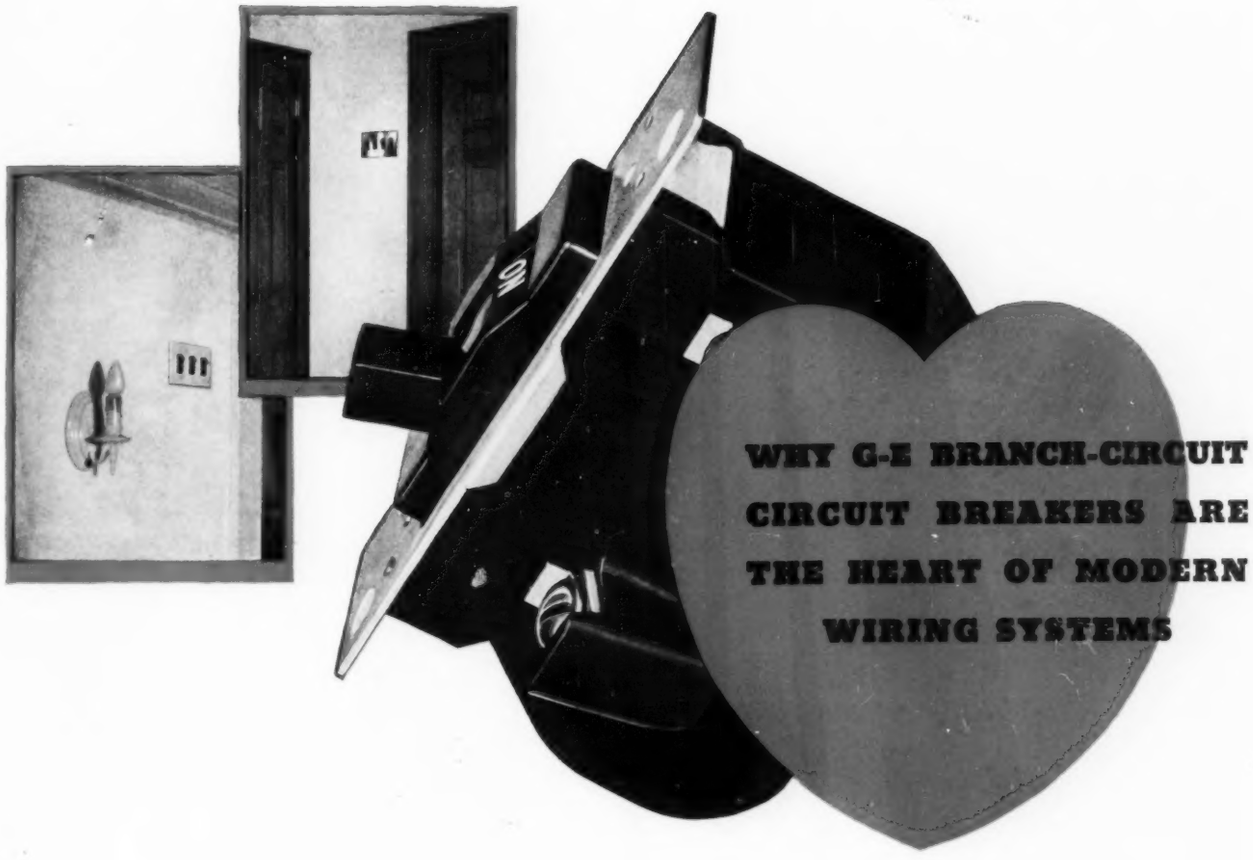
A few installations of Cheney Flashing, Revere Brass Pipe or Copper Tube, and Revere Sheet Copper or Leadtex are listed above.

Revere Copper *and* Brass

INCORPORATED

FOUNDED BY PAUL REVERE 1801

EXECUTIVE OFFICES: 230 PARK AVENUE, NEW YORK CITY · MILLS: BALTIMORE, MD. · TAUNTON, MASS.
NEW BEDFORD, MASS. · ROME, N. Y. · DETROIT, MICH. · CHICAGO, ILL. · SALES OFFICES IN PRINCIPAL CITIES



WHY G-E BRANCH-CIRCUIT CIRCUIT BREAKERS ARE THE HEART OF MODERN WIRING SYSTEMS

You are designing today's home for comfortable and convenient living. Wisely, you consider a modern wiring system of vital importance. Now, General Electric introduces a new circuit protecting device, which is designed for standard outlet box mounting, that aids you in functional design of homes, apartments, and other buildings.

These new Branch-circuit Circuit Breakers fit in well with modern trends. Your clients will appreciate the livability that they add to the homes you design. These devices apply the successful principles of protection and control, long used for industrial equipment. They can be furnished in capacities of 15, 20, 25 or 30 amperes; single-pole, 125 volts A-c. or D-c.

You will be most interested in the convenience that their use offers your clients. Because they have the neat outward appearance of flush Tumbler Switches, they can be placed in living rooms, kitchens, bedrooms — and their appearance is similar to that of the neat appearing Tumbler Switches.

When a short circuit or overload occurs, service in that particular circuit is resumed after the trouble has been removed, by simply flipping the breaker. They can be placed in accessible spots about the house near the circuit that they protect. Thus, inconvenient changing of fuses in branch circuits is eliminated. Home owners will appreciate this step-saving feature which is another aid to good housekeeping.

As well as convenience, mark these additional advantages of using G-E Branch-circuit Circuit Breakers:

They offer safe and positive protection. Factory calibration and sealing practically eliminates tampering. They insure positive short circuit and accurate overload protection for branch circuits.

They may be used as master switches to control the circuits that they protect.

These breakers are designed for all conventional wiring systems and are specified in the new G-E Radial Wiring System.

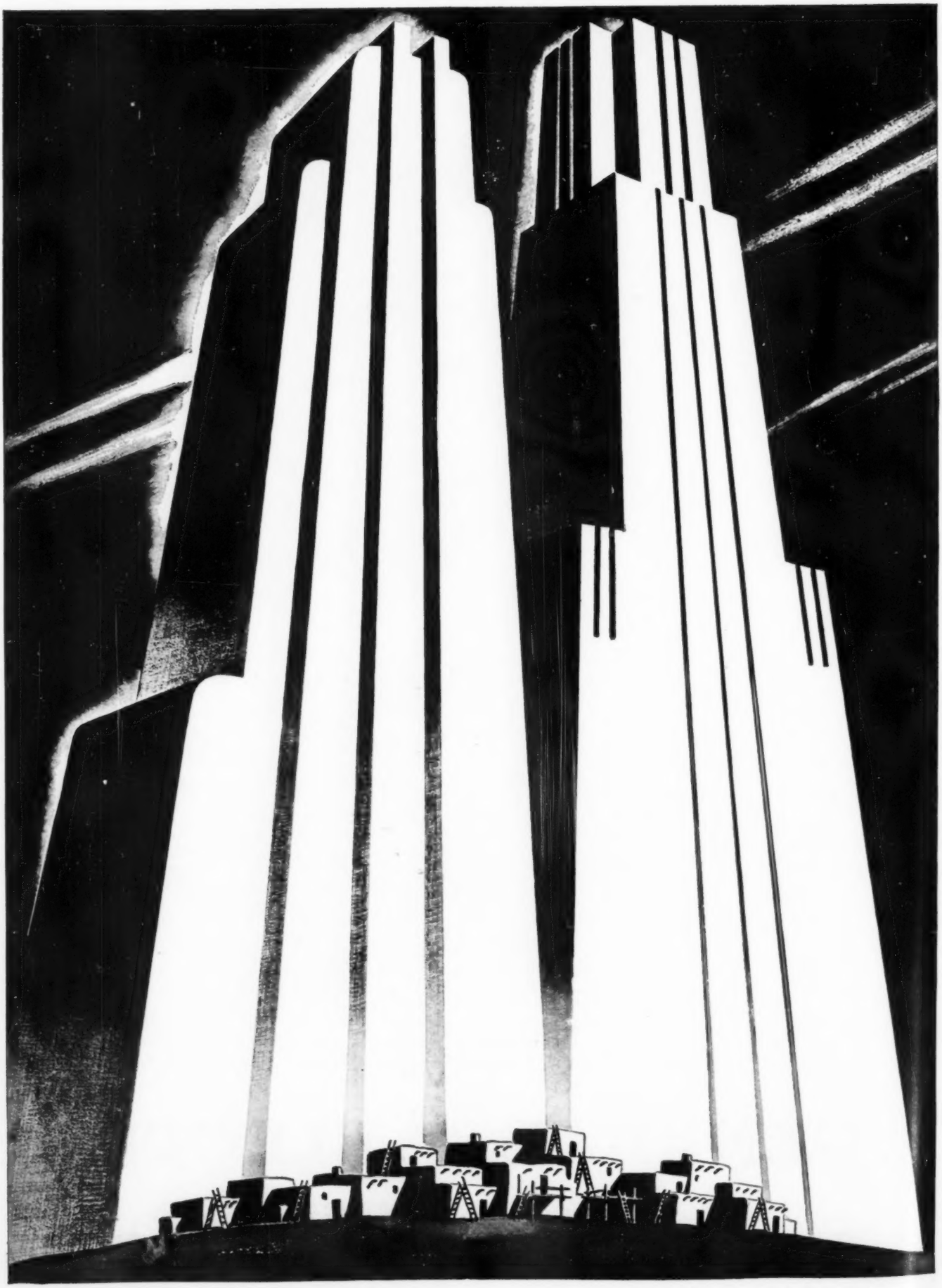
They have satisfactorily passed all tests of, and are listed by, the Underwriters' Laboratories, Inc.

For further information on their convenience - appearance - safety and control, refer to "Sweet's Architectural Catalog" and "American Architect Time-Saver Specifications", or write Section CDW-136, Appliance and Merchandise Department, General Electric Company, Bridgeport, Connecticut.

GENERAL ELECTRIC

WIRING DEVICES

APPLIANCE AND MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONN.



DARWIN WAS RIGHT

that's why Bethlehem keeps an eye on trends

MR. DARWIN'S famous theory applies not only to living things but to purely inanimate objects as well. Just as mankind has progressed and changed so has there been equally steady development and change in architectural forms and construction methods. Each age has produced the type of structure best suited to its own civilization. Here in America we have gradually progressed from the crude pueblo of the Southwest and the pioneer's log cabin to the towering steel-framed structures characteristic of the twentieth century. Now we are entering an era of clean-cut structures designed purely for the functions of modern living.

Naturally, this increasing emphasis on simplicity and clean, direct line has necessitated the development of an entirely new structural technique calling for entirely new types of structural members. No one knows that better than the architectural and engineering professions—and Bethlehem Steel Company, which has consistently forecast these changing requirements and taken the steps necessary to meet them. Bethlehem's success in this endeavor is demonstrated by the widespread acceptance of Bethlehem Structural Steel Members and their use in virtually every type of construction project from small dwelling to giant skyscraper.

DIVERSITY OF MEMBERS— DIVERSITY OF USES

No single construction field has been neglected. Bethlehem Steel Members are equally at home, equally important, in the Golden Gate Bridge at San Francisco and a private home in New Rochelle. That in itself is indicative of the careful and extensive analysis Bethlehem has made of present-day structural requirements and of the unique service offered to architects and engineers.

STEEL FOR HOMES OF TODAY— A CASE IN POINT

The decided increase of general interest in the steel frame house as a permanent structure and a safeguarded investment has created a widespread demand for steel members especially designed for this purpose. Here again Bethlehem forecast a definite trend and perfected members best adapted to the new construction method.

The Bethlehem Steel Stud and Open-Web Steel Joist are even more adaptable than wooden members and are handled in an identical manner, with the cutting torch and



electric arc welder replacing the saw and hammer. Their use does not handicap the designer in any way or affect the appearance of the completed structure in the slightest degree. Used either alone or in combination, these new Bethlehem members greatly enhance the rigidity, permanence and security of the home or other light occupancy structure in which they are used.

CENTRAL SOURCE OF SUPPLY

Bethlehem Open-Web Steel Joists and Studs form only a relatively small part of the complete range of Bethlehem Steel Products for Building Construction. No form of steel required in modern structural practice has been omitted. Architects and engineers can specify from a central and united source of supply the steel best suited to aid in the solution of the problem at hand.

BETHLEHEM STEEL PRODUCTS FOR BUILDING CONSTRUCTION

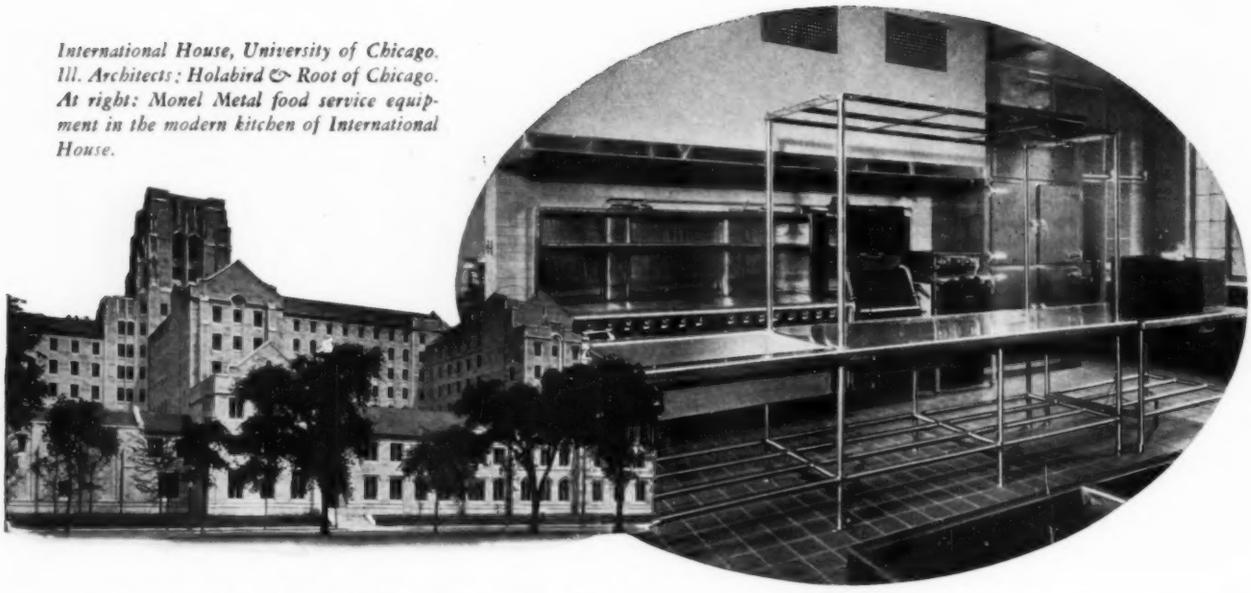
Bethlehem Wide-Flange Structural Shapes, Bethlehem Light Sections, Bethlehem Steel Studs, Bethlehem Open-Web Steel Joists, Beth-Cu-Loy Galvanized Sheets, Bethlehem Steel Pipe, Steel Door Frames, Kalmantrim, Metal Lath, Bethlehem Insulating Wool, Reinforcing Bars, Steel H-Piling, Steel Sheet Piling, Bolts and Nuts, Rivets.

BETHLEHEM STEEL COMPANY, *General Offices:* Bethlehem, Pa. *District Offices:* Albany, Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Honolulu, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Portland, Ore., Salt Lake City, San Antonio, San Francisco, St. Louis, St. Paul, Seattle, Syracuse, Washington, Wilkes-Barre, York. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

International House, University of Chicago, Ill. Architects: Holabird & Root of Chicago. At right: Monel Metal food service equipment in the modern kitchen of International House.



HIGH STANDING
in Halls of
HIGHER EDUCATION

MONEL Metal for food service is one point on which even West Point and Notre Dame agree. So do Harvard and Yale. All these great schools (not to mention Leland Stanford, Tulane, Rutgers, Chicago and many others) have installed Monel Metal equipment in cafeterias and kitchens.

Food displayed on a silvery Monel Metal counter always looks more appetizing. Furthermore, these smooth surfaces are exceptionally easy to keep clean and sanitary. And hard usage means nothing in Monel Metal's long life. It is rust-proof, chip-proof, crack-proof, accident-proof.

We have recently published an informative booklet entitled, "The Selection of Food Service Equipment" — profusely illustrated with actual photographs. A copy is yours for the asking.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET NEW YORK, N. Y.

MONEL METAL

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.



Above: The Monel Metal kitchen in the Administration Building of the Board of Education, Philadelphia, Pa. Architect: Irwin T. Catharine, Philadelphia, Pa.

* * *

From this spacious Monel Metal kitchen comes the food which helps keep Notre Dame's famous athletes in championship condition. Note the 58-foot Monel Metal canopy over the range. Architects: Maginnis and Walsh, Boston, Mass.



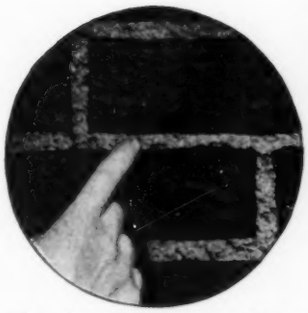


Photo shows ordinary mortar joints—shrunken, cracked, permitting rapid water seepage.

PROOF THROUGH PERFORMANCE

. . . Mortar shrinkage checked with

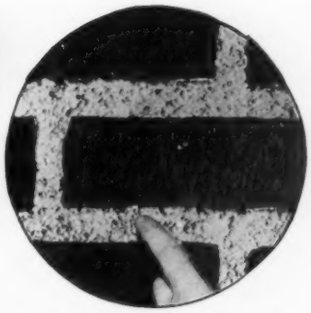
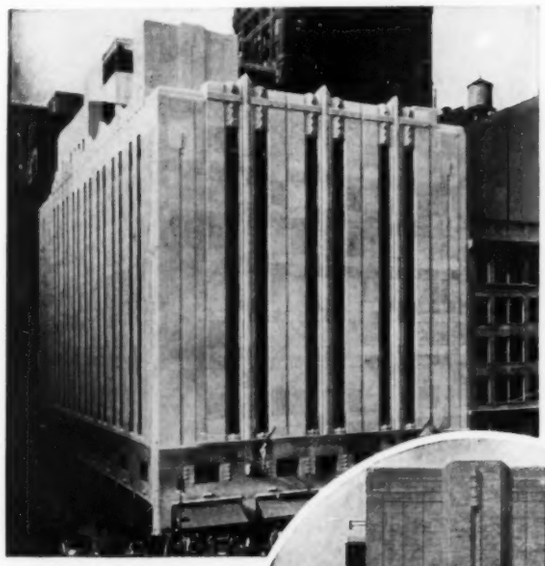


Photo shows how Omicron Mortarproofing maintains bond between brick and mortar. No shrinkage!

OMICRON *Mortarproofing*

TRADE MARK



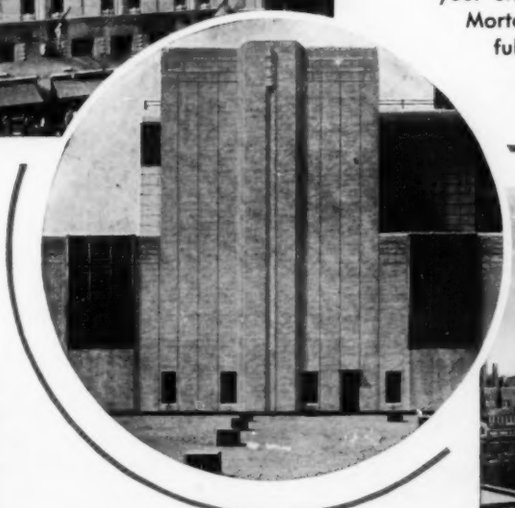
● Positive protection against shrinkage cracks and bond failure . . . the real causes of leaking brickwork!

Used with all types of mortars on major projects throughout the nation, Omicron Mortarproofing has *proved through performance* its ability to reduce shrinkage by 50% or beyond the point where the bond breaks. Authorities agree that all mortars SHRINK, whether lime, patented masonry mortars, cement — waterproofed or otherwise. Omicron Mortarproofing is the first *successful* solution to the problem of mortar shrinkage — so successful that many architects and builders call it "brickwork insurance!"

On the completely weatherproofed buildings illustrated here, the cost of Omicron Mortarproofing was less than 1% of the cost of the brick installed. In your own and your clients' best interests, learn what Omicron Mortarproofing can do for you! Write now for full information.

MASTER BUILDERS CO. • Cleveland, Ohio
In Canada: Master Builders Co., Ltd., Toronto

(Above:) S. H. Kress & Co. new Fifth Ave. Store, New York. Edward F. Silbert, Architect. Michael Wielandt Co., General Contractors.

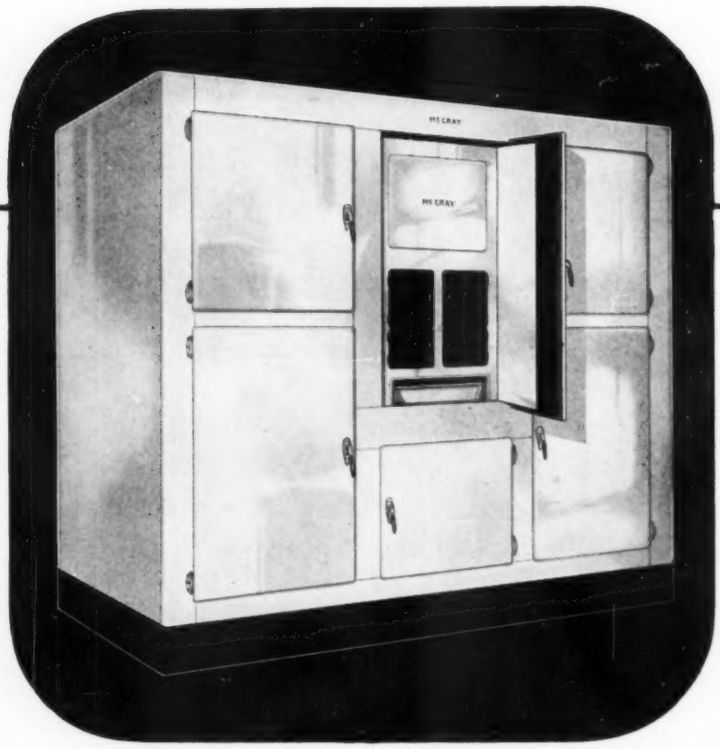


(In circle at right:) Close-up view of the brickwork on the new S. H. Kress & Co. building. An exhaustive examination of the completed building revealed no shrinkage cracks in the mortar!



(At right:) Women's College Hospital, Toronto, Ontario, protected by Omicron Mortarproofing. Stevens & Lee, Architects, Harkness & Hertzberg, Contractors.

MASTER BUILDERS

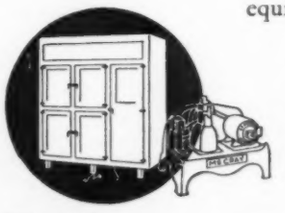


For Schools ··· AND INSTITUTIONS OF ALL TYPES *as well as Fine Homes*

WHETHER refrigeration requirements are limited or extensive McCray is prepared to meet every specific need efficiently and economically. For schools, clubs, hotels, hospitals and institutions of every type there are both stock and built-to-order models. Every McCray is built to the same high standard of quality. Highest grade materials, genuine custom craftsmanship, scientific engineering and the skill born of nearly a half-century experience combine to build long years of satisfactory service into McCray refrigerators.

For fine homes where refrigeration requirements exceed the capacity of standardized mass production models, McCray custom built refrigeration is the answer. For years McCray refrigerators have served in many of the country's finest homes. Today complete refrigeration by McCray with cabinet, coils and machine designed, engineered and manufactured for use together, provides the most modern, dependable and economical service available.

The refrigerator illustrated above is typical of a McCray custom built installation. McCray engineers gladly co-operate in suggesting stock models or designing built-to-order equipment to meet every need.



McCRAY REFRIGERATOR SALES CORPORATION
690 McCray Ct., Kendallville, Ind.
Salesrooms in All Principal Cities.
See Telephone Directory.

McCRAY *Complete Refrigeration for all purposes*

"In fact it is highly satisfactory"



"We have been in our offices for almost a year and there is no apparent wear in the Sloane-Blabon Linoleum. In fact, it is highly satisfactory."

The Linen Thread Co., Inc.



Illustrated is the main office of the Linen Thread Company situated in the Lincoln Building, New York . . . one of the many recent Sloane-Blabon installations. The specifications for this job were — durability, resiliency, attractive colors. Sloane-Blabon met them all. The net result is an exceptionally good-looking floor . . . a floor that can take the hard wear of a busy office. Linoleum is the modern way to add color and relieve both foot and eye tension.

We shall be glad to send you a list of other Sloane-Blabon installations, together with samples and our new Linoleum Handbook. Write W. & J. Sloane, Selling Agents Division, 295 Fifth Avenue, New York, N. Y.

SLOANE-BLABON LINOLEUM

ARCHITECTURALLY SPEAKING

by

OTIS ELEVATOR COMPANY

NEW FEATURE. Automatic doors have been added to the "serve yourself" (Automatic Collective Control) apartment house elevator. Now the passenger doesn't even have to close the doors by hand. All he has to do is press a button to call the elevator and press his floor button inside the car. The elevator does the rest. Saves time during rush periods (whether there's an operator in the car or not). Provides the highest type of apartment house automatic service.



AVAILABLE. Duplex Collective Control for apartment house or other building desiring "serve yourself" elevators and where more than one elevator is needed to handle traffic. Duplex Collective Control supplies *co-ordinated automatic operation.* In other words, two elevators work together as a unit. No duplication of effort—no wasted trips.



A building deteriorates along with the elevators. It doesn't mean much to build with good materials if the elevators are going to start down the wear-and-tear hill from the time they are installed. And we are suggesting that a builder be sold *elevator service* rather than just an elevator installation. He buys such *service* when he buys an installation *plus* maintenance by the manufacturer. This way he is looking ahead and providing for the continuation of *good service* after the new wears off.



Interested in department store construction or modernization? There are 580 Escalators in sixty-five department stores in this country. Investigation has shown quite conclusively that Escalator transportation scatters more people throughout a store, boosts sales and profits. In other words, *where Escalators move merchandise moves.*



If any of your clients have been hesitating about elevator modernization, there is no reason now why they should delay. Our step-by-step modernization plan breaks the work down into stages—each paid for as it is done.

REVIEW OF CURRENT BOOKS

A FINE PARTING WORD

CITY PLANNING - HOUSING *by Werner Hegemann. Architectural Book Publishing Co., New York.* 1936

Ever since the sentimental fumbling of James Hole, in his "Homes of the Working Classes" (1866)—it may not be the first but it's the oldest in my collection—books about housing have comforted the romantics, tickled and flattered the experts, and given new hope to fainting reformers as they grimly climbed away at what Mr. Santayana so aptly calls "the greased pole of virtue."

On they marched, in deathless bands, from decade to decade. Their song was "Upidee." Their first attack was by exhortation. They spoke sternly, but in Christian terms, to usurious landlords and greedy employers. Step by step—for the results of exhortation were discouragingly meager—they got into action. They tried picking odd bits of cheap land, new ways of building, cheaper substitute materials, limited interest or dividends, mass production, government cheap money, government subsidies, arriving at last in the fairyland of prefabricated houses and a government largesse so Midas-like that strong reformers swooned, whilst desperate landowners watered at the mouth.

Quietly, as all but the very dull well knew, the housing problem became a minor but fairly steady wage-paying racket. Just as Louis Sullivan found that his father, who tried one Boston preacher after another, was not interested in religion but in oratory, so the beneficiaries of the housing problem racket found that many people would pay to listen to their talk. They also liked to watch the room-jugglers as they packed the human sardines ever tighter and tighter, and to marvel at the magicians who kept pulling new wall, roof, and floor substitutes out of the industrial hat. Strange to say, however, the slums went right on. They steadily increased their spread and covered more and more of the face of what is called civilization. By 1936, the United States had a third of its people in squalor; another third on the verge of it; and a vast army of workless.

During the last two decades, a new type of expert called "planner" has edged his way into the housing lists, and the economists also butted into the joust. As a result of the last financial wallop, housing also got into the peace-halls of government, as it got into the war-halls in 1917-18. It even became a plank in a political platform. Thus there are many citizens who want something done, not only about slums but about the steadily sinking quality of all kinds of houses. There are millions who now look wonderingly at the crack in their fairly new house, where the floor has parted from the walls, and at the other cracks that show the hundred other partings. (It is commonly agreed, I believe, that the new crop of houses now being signed for by the new crop of suckers, marks an even lower stage of shabbiness and shoddy.) The proposals for dealing with these things, particularly with slums, are still hardly less romantic than were those of James Hole.

At last an eminent student speaks. His words are clumsy, but almost he says what needs to be said and what one feels that he knew. With the courage and integrity of a scholar he points out that it was not Karl Marx who said that "Labor is superior to capital." Nor was it Lenin who condemned "the effort to place capital on an equal footing with, if not above labor, in the structure of government." No—it was Abraham Lincoln who wrote these words, as every well-read American knows. Also, Hegemann reminds us, when Lincoln wrote for the New York Tribune, Karl Marx was also a paid and respected contributor. There was, it appears, a time when intelligence was accepted as a way to understanding, in America!

By many such carefully documented analogies, Hegemann shows the relation of what he accepts as the planning vision of Washington, Hamilton, Jefferson, and Lincoln, to the later underlying planning of the Russian experiment. (Until the reader has read and digested the two volumes on Russia by Sidney and Beatrice Webb, he will do well to refrain from being too sure what it is all about, or how it works, or what it has done.) He will also do well to eschew the present literature on housing with its quackery obligato, bolstered by romantic tales from the insolvent Europe that now prepares for another good fling at murder, and to sit himself down soberly to grapple with the findings of Werner Hegemann.

The housing problem is a land problem. Man can have no life save by and out of land. It is a legal problem, for land is now private property. It is a money problem, for houses are paid for in money. It is many other problems, but basically it is a planning problem.

Planning of what? Planning to distribute income. The beginning is there and nowhere else. Nothing less will do. The plan begins with the dividing of the income produced by putting labor to land and its resources so that good houses and the decent life that ought to go with them can be had by every deserving citizen. Not had on a string, as under the present ghastly mortgage-debt and tax arrangements, but had as a secure life anchorage, against which the wiles and tricks of usurers and exploiters shall beat in vain. Until that plan is made and put into operation, all the tinkering of the experts, the diddling of the planners,

the "Drawling, Stretching, and Fainting in Coils" of the economists, make up little more than an Alice in Wonderland nonsense, overworked though the simile may be. A sort of pleasant racket, as long as the job holds, for the thousand odd architects and draftsmen now in Washington, for example, on the white collar housing dole. When Mr. Parker, to take a recent exhortation (*Architectural Record* for April), begs architects to go over the top in the grand and glorious charge of the government's housing-insurance, land-price-raising racket, he deals in metaphors that Mr. Hegemann shuns. Insuring the mortgage on a house insures not the buyer but the money lender! This idea seems to be much obscured in a good deal of the propaganda. No, the buyer's income is not insured. He holds the house on the usual string, just as he might hold a hundred shares on margin. There the matter rests.

But the millions who lost their homes in the last wholesale financial racket, lost not because of the cost of the house, outrageous as it mostly was, but because they lost their income! Does any one believe that the new crop of house-buyers will fare any better? How can they? What worker in the United States does not now know that his income grows ever more precarious?

There lies the problem. Its solution means a major operation. If Mr. Hegemann had lived to write one more book (he died very recently) he would surely have noted that the low-cost housing "need" is a major factor in the suicide of what is called capitalism. Smart government publicity hounds have now coined the phrase "Housing for low-income groups," but the suicidal process is the same. It was Mr. Tugwell who said, no later than 1933, as the Webbs note in their book, that "If we lack purchasing power, we lack everything. Possessing it, we have everything we value. . . . The energy and ingenuity which have been expended on our financial institutions ought to be turned towards the repairing of a national damaged purchasing power."

By the same token it is equally true that the energy and ingenuity expended on houses for "low-income groups" means that we not only accept the premise of a vast and increasing population with low incomes and little purchasing power, but that we also pave the way for further and almost certainly lowering their incomes! Does any one suppose that if government doles out rent, in whatever form, employers will raise wages? Since when have poorhouses diminished the number of the poor? The condition that Mr. Tugwell deplores will be further aggravated by every government housing plan and program, including the large-scale ones of his own Resettlement Administration! A momentary salve will ease the social pain, but what of the pain to follow? There may be some small technical gains, but even these are largely inhibited by the cold costs of a process that is still terribly usurious.

No, until the major operation (again, Mr. Hegemann points out, it was not Stalin, but Henry Ford who put his finger on one of the most salient aspects of this operation) all the housing agencies and programs are no more than whistling to keep up the courage and prop up the ever more tragic racket, whether it be that of RA, PWA, FHA, HOLC, or any other alphabetical cohort. The doles to architects, draftsmen, planners, and other experts, are abundant and even copious. They are a heavy price to pay, however, for the little housing mouse that will presently creep forth, and for the bugbear that will follow as debt bears down like a glacier whose chill already makes every honest man shudder.

Hegemann's reflections are particularly good reading for those architects who read, and even better for the large number who never read. They contain a heap of accurate information, and a rather solemn warning.

Charles Harris Whitaker.

●

PLANNING FOR WHAT?

STATE PLANNING: REVIEW OF ACTIVITIES AND PROGRESS: *National Resources Board. U. S. Government Printing Office. Washington. Price: .75*

Over two years ago, in Washington, there was established a "National Planning Board" to correlate and integrate the work of the various Federal, state and local planning agencies. Its main objective was the fostering of State Planning Boards in each of the states; in this it has largely succeeded. There are now 46 such State Boards and this Report summarizes briefly their work through 1935.

This Report is in some respects a significant document. It represents the first national recognition of the need for planning, and the first national effort to integrate such work. But equally significant is the fact that nowhere is the word "planning" defined or its objectives outlined. As a technical performance, planning may be assumed to consist of three major phases: (1) Inventory; (2) Design; (3) Execution. But these are merely the mechanical means whereby some line of action is put into effect, some objective obtained. What are the social and economic objectives of this Report? A careful analysis reveals that this Report is primarily an inventory; but it establishes no criteria by which these collected facts may be weighed. How, then, can planners proceed to the next phase—design? What are they designing, and for whom? And without design, how can they execute?

Inventories, no matter how technically competent, are of little value unanalyzed: national inventories are of still less value unless analyzed by a common method and by common criteria: and all inventories are completely valueless unless the method of analysis is scientifically correct and unless the social - economic criteria meet the demands of modern industrialized production.

●

TO BE REVIEWED

ARCHITECTURAL GRAPHIC STANDARDS: by Ramsey and Sleeper. John Wiley and Sons, New York and London. Price: $6

A SMALL HOUSE IN THE SUN: by Samuel Chamberlain. Architectural Book Publishing Co., Inc., New York. Price: $4

DESCRIPTIVE GEOMETRY: by C. H. Schumann, Jr. D. Van Nostrand Company, Inc., 250 Fourth Avenue, New York. Price: $2.75

HELENISTIC ARCHITECTURE: by Theodore Fyfe. Cambridge: at the University Press. New York: Macmillan Company. Price: $6

HOUSING OFFICIALS YEARBOOK—1936: National Association of Housing Officials, 850 East 58th Street, Chicago. Price: $2

RECEIVED

HOUSING FOR THE FAMILY: Women's City Club of New York, 22 Park Avenue, New York. Price: 25¢

LEGAL AND ETHICAL PHASES OF ENGINEERING: by Harding and Canfield. McGraw-Hill Company, 330 West 42nd Street, New York. Price: $4

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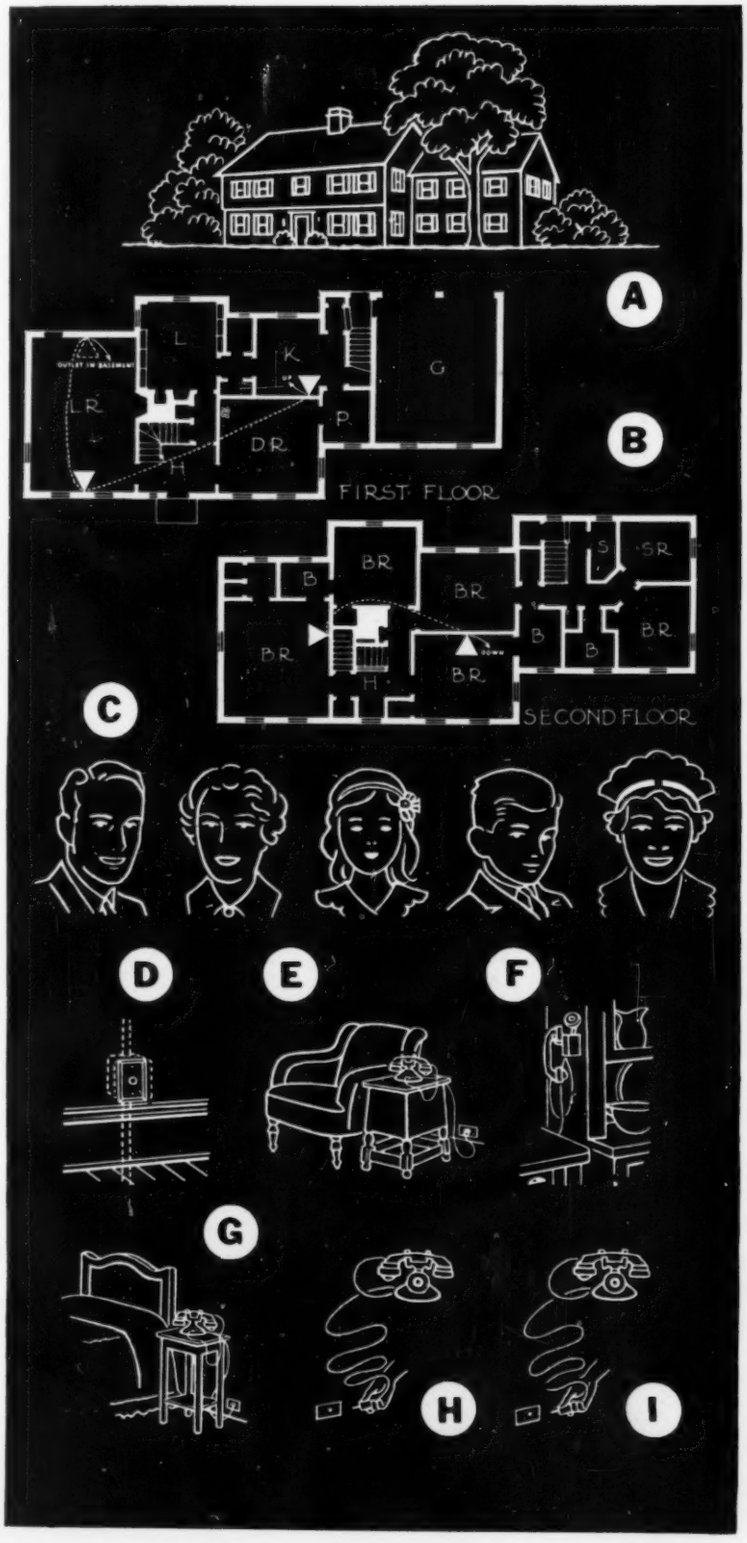
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F An outlet in the kitchen for household business.

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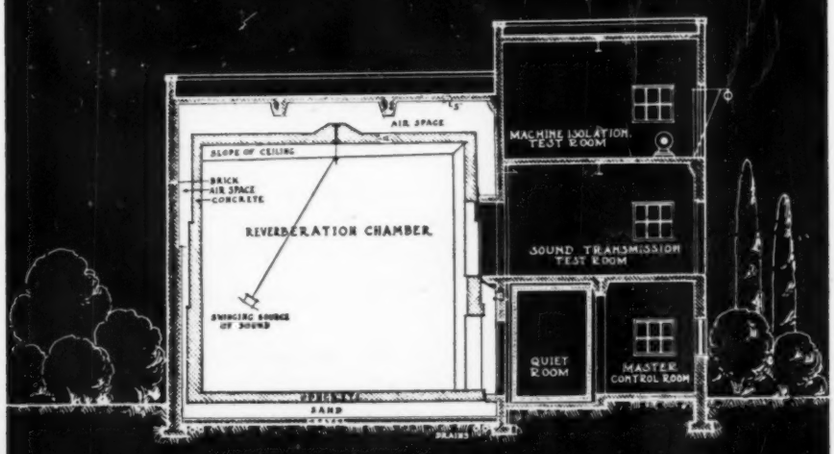
standards and uniform practices of installation and engineering for the air conditioning industry.

Headquarters have been established at 7621 Woodward Avenue, Detroit. Other officers are E. L. Boyd, secretary, and T. F. Leeson, treasurer.

gold medal to brasscrafters

A line of bathroom accessories combining chromium plated brass and catalin by the J. P. Eustis Manufacturing Co., of Cambridge, Mass. (The Brasscrafters), won the Edward R. Mitton Gold Medal at an exhibition sponsored by the Boston Chamber of Commerce, as the outstanding design developed in New England since April 1, 1935, in the "Living" group which comprised furniture, silverware, jewelry, textiles and other items. The jury awarded the medal for the product which best performed its function simply and efficiently.

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glass institute

The primary purpose of the Pittsburgh Glass Institute, which has just been formed, is to assemble available data on the uses and application of glass. E. L. Patton is to be Director of the Institute, which will have an advisory board comprised of eight members, each an expert in one particular phase of the industry. Offices will be established at 30 Rockefeller Plaza, New York City.

concrete reinforcing steel institute

The Twelfth Annual Meeting of the Concrete Reinforcing Steel Institute was held at the Homestead Hotel, Hot Springs, Virginia, April 20 to 22. The meeting was well attended by representatives of both mills and fabricators. The following officers were elected for the year 1936-37: President, E. W. Langdon of Joseph T. Ryerson & Son, Inc., Chicago; Vice-Presidents, James F. Curley, Vice-President, Concrete Steel Company, New York City, and Kenneth D. Mann, Executive Vice-President, Truscon Steel Company, Youngstown, Ohio.

rural electric equipment

Designed to assist in rural electrification programs, a four-page bulletin discussing and tabulating the costs of operating electric farm and home equipment has been published by the General Electric Company, Schenectady, N. Y.

The booklet illustrates a number of uses for which electricity may be economically employed on the farm and in the farm home, explains what a kilowatt hour of electricity is and will do, and lists some fifty representative farm applications, giving national average kilowatt-hour consumption for each.

Designated as publication GEA-2248A, it may be obtained free of charge by addressing the company's Rural Electrification Section in Schenectady.

concrete in schools

A booklet bearing this title has been prepared by the Portland Cement Association, 33 West Grand

(Turn to page 49 adv.)



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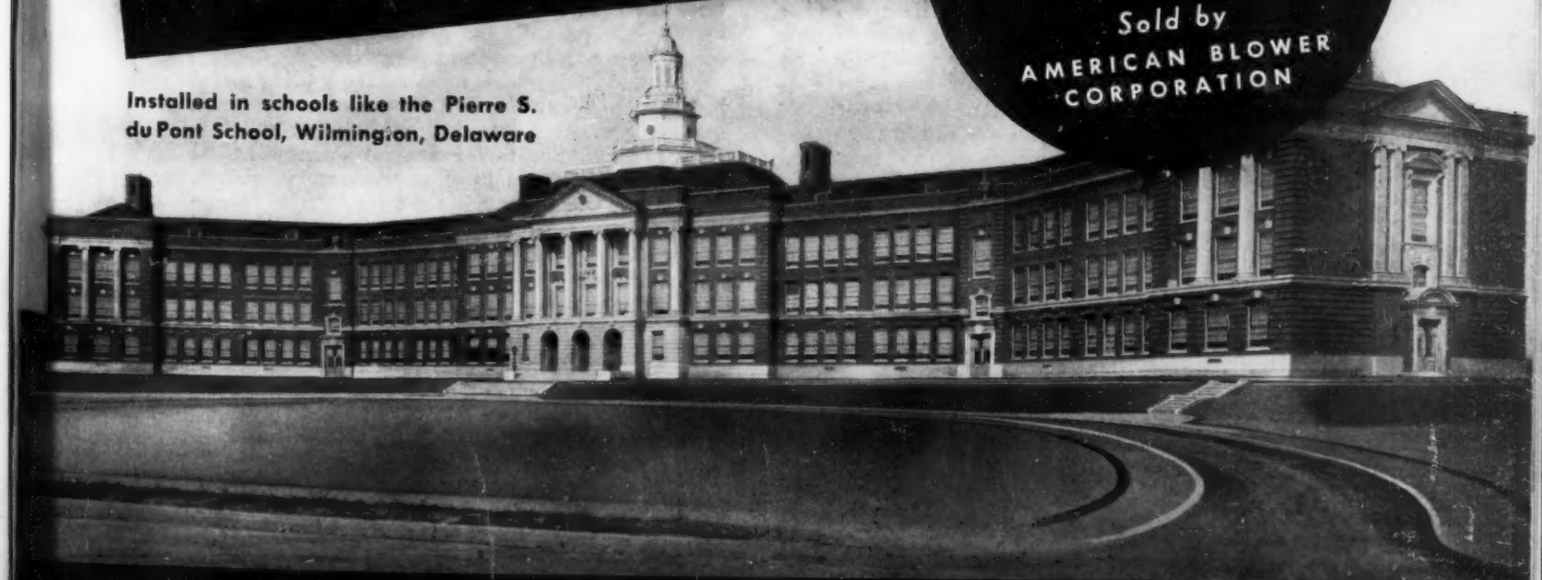


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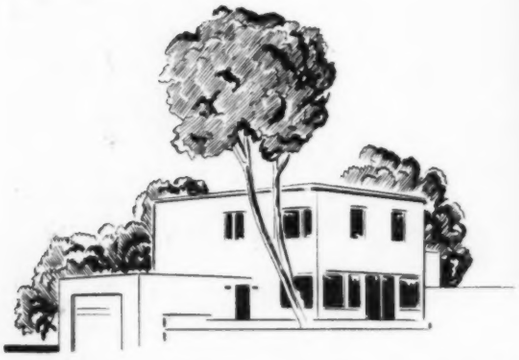


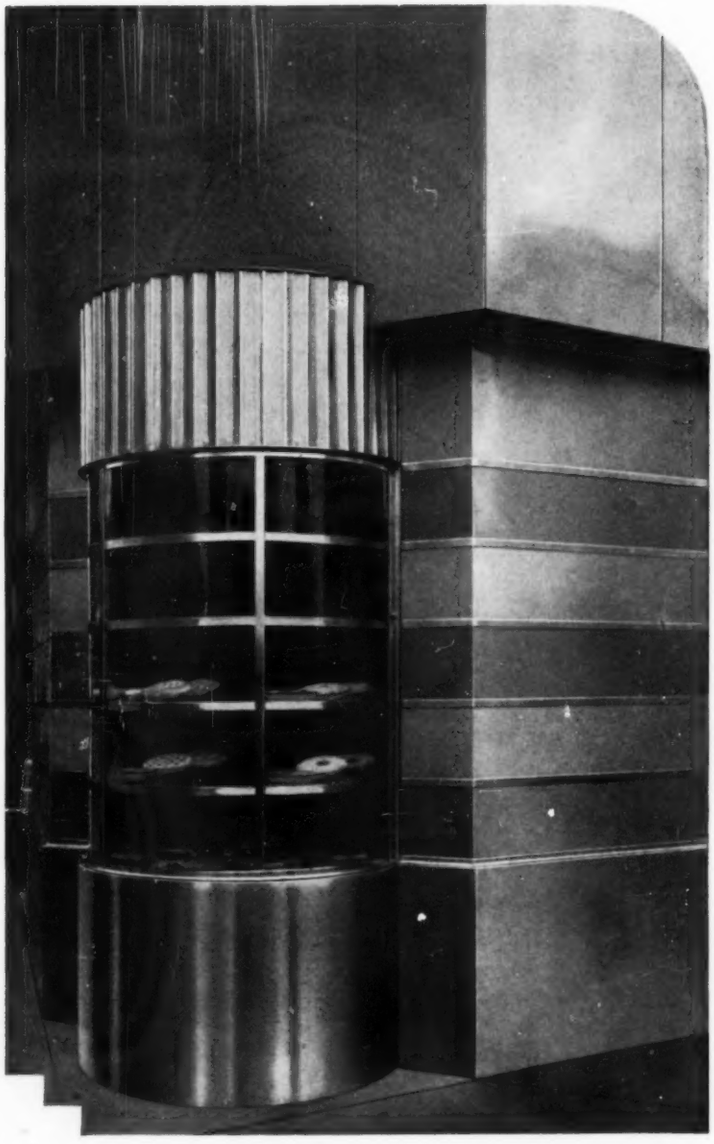
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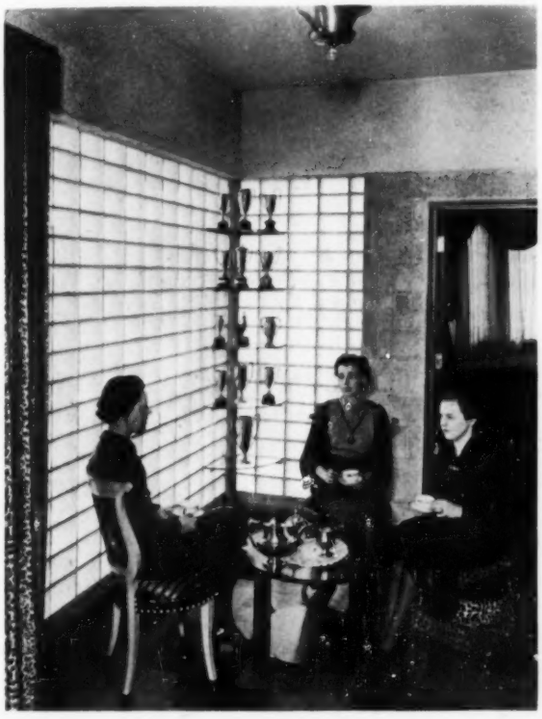
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A brochure, "An Economist's Appraisal of Domestic Electric Refrigeration," by Warren M. Persons, has just been published by The Temperature Research Foundation of Kelvinator Corporation, 420 Lexington Avenue, New York.

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Planned Plumbing and Heating for Better Living. Kohler Co., Kohler, Wis.

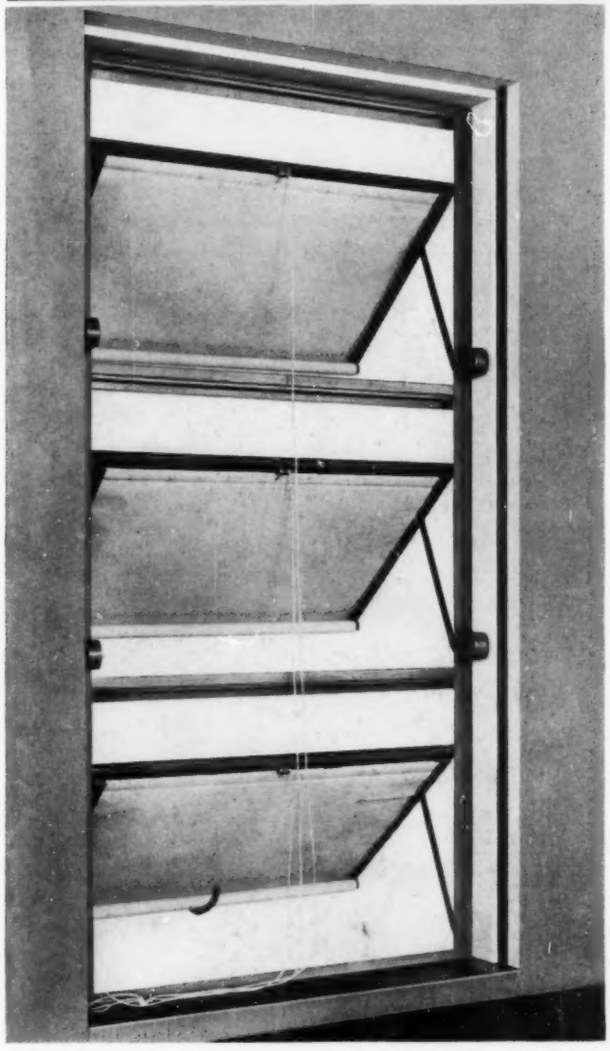
Safe-T-Showr Thermostatic Water Mixing Valve. Doran Company, 75 Horton Street, Seattle, Wash.*

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Drawing and Sketching Materials. Koh-I-Noor Pencil Company, Inc., 373 Fourth Avenue, New York.

* Asterisks indicate the manufacturers on whose products additional information is available in Sweet's Catalog File.

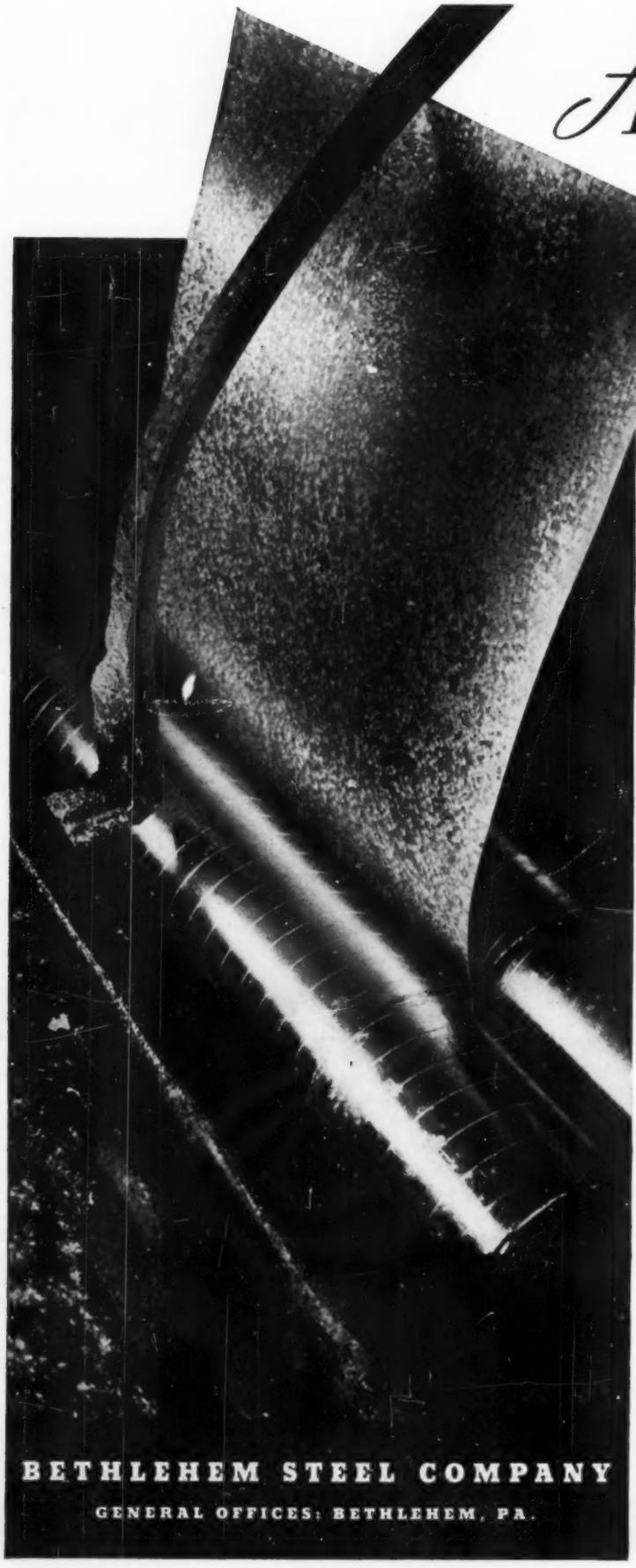
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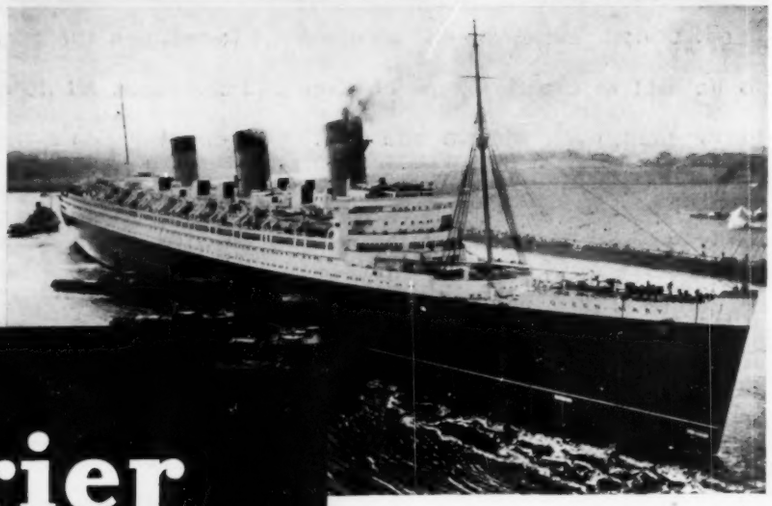
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Why? Because Carrier Engineers have been designing air conditioning equipment, and making it, for 25 years for every size and type of building. Experience devoted *solely* to the creation* and development of the air conditioning art. This experience can't be bought.

Should you want to determine in advance whether it will pay to air condition a certain office building, send for the Carrier Econograph. It will tell you. No charge. Address: Carrier Engineering Corp., 850 Frelinghuysen Ave., Newark, N. J.

*Willis H. Carrier founded the science of air conditioning in 1911 with the disclosure of the psychrometric chart to The American Society of Mechanical Engineers.

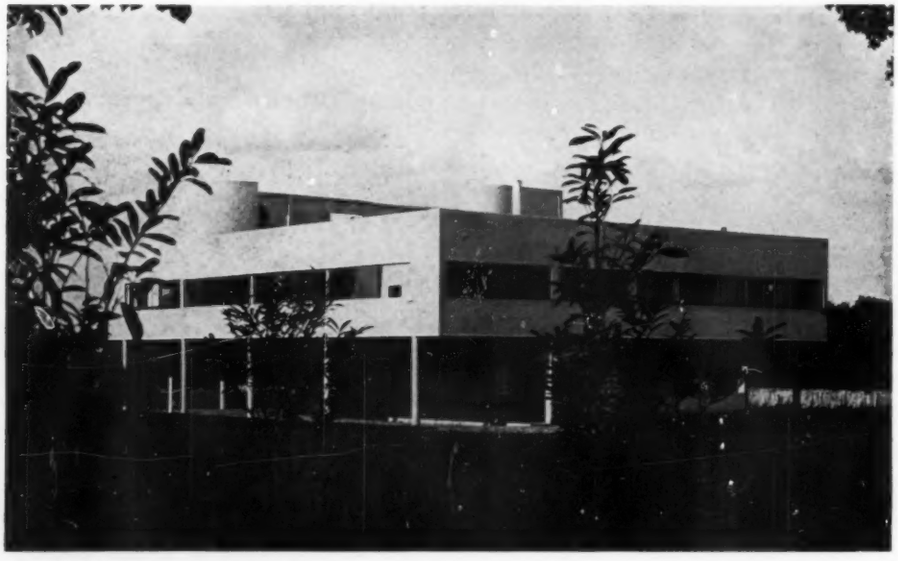
Call Carrier



THE MODERN HOUSE

By F. R. S. YORKE, A. R. I. B. A.

THIS important and timely book will be invaluable to every architect, designer and student of PROGRESS in residential building. It reflects the latest advances in the design and construction of Modern Dwellings not only in the United States and England but in France, Germany, Holland, Belgium and other countries abroad. It is filled with practical information on plan, design, methods of construction, materials and equipment. It outlines the requirements to be met in the new type of home and discusses all its component parts—plan, wall, window and roof. One chapter deals with Experimental and Prefabricated Houses and over 100 pages are devoted to typical houses erected from 1924 to date. The book contains 200 pages 7½ x 10 with about 500 photographs, plans and constructional details. It is sold in the United States by The Architectural Record at $6 postpaid. Use the coupon below!



THE ARCHITECTURAL RECORD
119 West 40th St., New York City

Enclosed is $6 for which send me a copy of THE MODERN HOUSE, by F. R. S. YORKE, A.R.I.B.A.

Name .....

Address .....

City and State..... A.R. 6-36



RIXSON announces a NEW Concealed Check!

A Single Acting Overhead Door Check with These

MODERN FEATURES

1. Concealed within head frame
2. Embodies roller bearings
3. Super-strong, special forged and hardened gear teeth
4. Double valve checking control
5. Hold-open feature when desired
6. Simple to install
7. Suited to wood or metal doors hung on butts—interior, vestibule or entrance.

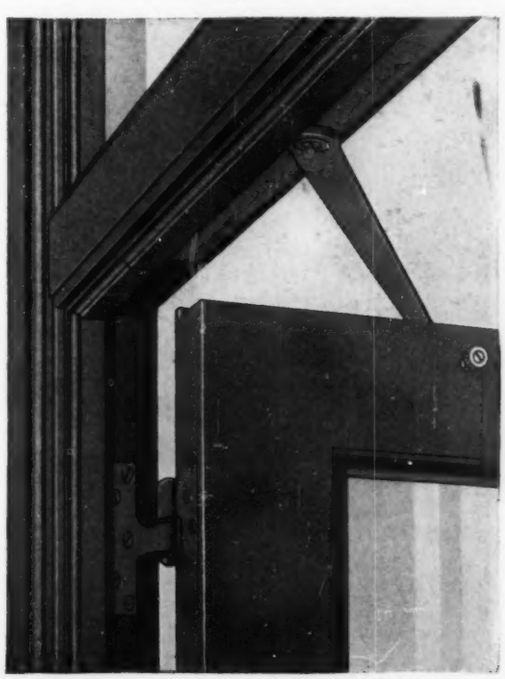
Because the construction industry looks to Rixson for devices of special distinction the announcement of a new Rixson Specialty is particularly significant.

The latest addition to this line of "standard specialties" is the most logical of all possible developments in door hardware. The new Rixson Concealed Overhead Check for exterior, vestibule and interior doors hung on butts, is invisible. It removes from view the awkward, bulky mechanism formerly required to control the door. The Rixson No. 220-225 is installed in a simple fashion within the head frame or transom bar.

The architectural world will welcome this device. It is a boon to designers of modern interiors from stately public building vestibules to private apartments where unbroken flat wall surfaces are featured in the decorating scheme.

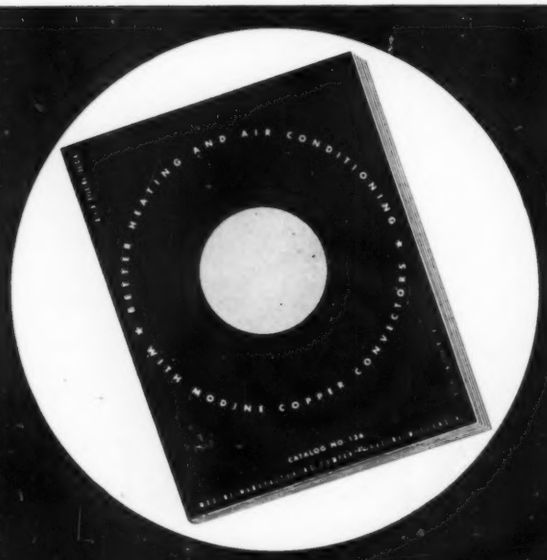
Specifications showing the device and its easy installation without special detailing are available on request. Write for them.

Notice, in the illustration above, the butt shown is Rixson No. 2 Adjustable Ball Hinge, in new modern design, excellent for all doors controlled by overhead checks.



THE OSCAR C. RIXSON CO.,
4450 Carroll Ave., Chicago, Ill.
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RIXSON
Builders' Hardware Specialties



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New Book

It's a beautiful book . . . 32 pages . . . *printed in five colors* to do justice to the striking beauty of enclosure and grille designs of the New Modine Convectors.

It tells you how you can now offer the home builder virtually custom-built *flexibility* in arrangement of grille patterns and color, at standard equipment cost . . . make your own convector grille designs *at no extra cost* . . . to harmonize with the decorations or appointments of any style or period, in even the finest homes.

The four enclosure types . . . Concealed, Recessed, Floor Cabinet, Wall Cabinet . . . grilles, and copper heating unit . . . are described and illustrated . . . together with dimensional and installation diagrams and complete specifications.

One section of the book is an authoritative treatise on air conditioning. Why steam or hot water heating is the basis of true air conditioning . . . the extra benefits of the "split system" . . . the superiorities of copper convectors . . . are fully discussed. *A copy free, on request.*

MODINE MANUFACTURING COMPANY
1230 17th St. • RracINE, WIS.

WRITE for CATALOG NO. 136

HEATING, COOLING AND AIR CONDITIONING FOR DOMESTIC, COMMERCIAL AND INDUSTRIAL APPLICATION

THE RESTORATION OF COLONIAL WILLIAMSBURG

A Reprint of the December, 1935, Issue of THE ARCHITECTURAL RECORD. *104 pages, bound in cloth.* $1.00 *per copy.*



The demand for the December number of THE ARCHITECTURAL RECORD—devoted to the Restoration of Colonial Williamsburg—has been so great that it has been impossible to fill many of the orders received for the issue.

To meet this demand the material has been reprinted in a more substantial and lasting form with a sewed binding and cloth covers. While this style of binding adds to the cost, it is believed that those interested will prefer to have the story of the Williamsburg Restoration in this permanent book form.

Copies of the reprints are now available at $1.00 a copy postpaid. Use coupon below.

THE ARCHITECTURAL RECORD
119 W. 40th St., New York, N. Y.

Enclosed is $..... for which send ..... copies of your reprint, *The Restoration of Colonial Williamsburg*, bound in cloth, at $1.00 per copy.

Name .....

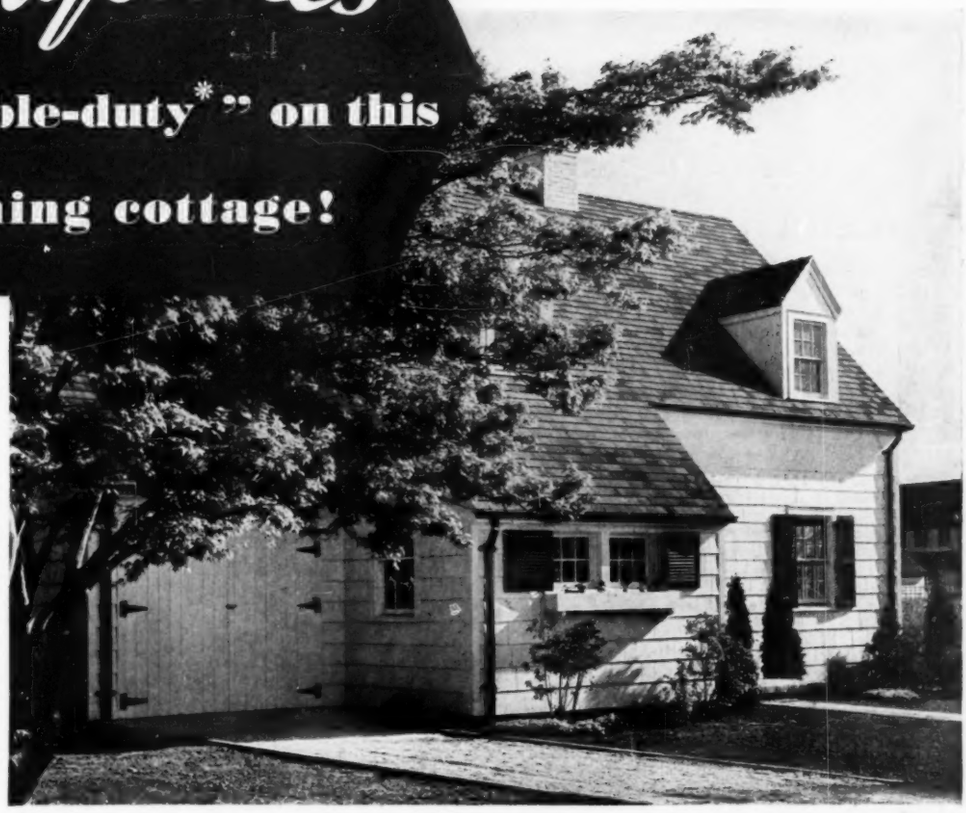
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A.R. 6-36

Certigrades

do "double-duty*" on this charming cottage!



Let Architect Maxmillian R. Johnke put it in his own words: "I have found by using CERTIGRADE Red Cedar Shingles on this cottage that they serve a double duty, in that they produce a low-cost insulation value in addition to the charming effect of early American architecture most pleasing to the owner. Needless to say, I specify them for most of my work."

• • •

This roomy six-room cottage at Hempstead, New York has both roof and side walls of CERTIGRADE Red Cedar Shingles. Maxmillian R. Johnke was the architect.

* they insulate as they decorate!

MR. JOHNKE strikes the keynote of CERTIGRADE Red Cedar Shingle superiority for both roofs and side walls. Their deep shadow lines, warm color tones and random widths give beauty to practically any type of design. Their unique insulation quality, due to millions of tiny air cells in the wood, resists penetration of heat and cold. Your clients will appreciate the way CERTIGRADES save on fuel in the winter—make homes delightfully cool in summer. And CERTIGRADE Red Cedar Shingles are economical too—first cost is surprisingly low and their extremely long life means years of protection from the elements without upkeep cost. For natural beauty, high insulation value, long life and low cost, specify CERTIGRADE Red Cedar Shingles.

• • • RED CEDAR SHINGLE BUREAU: *Headquarters,* Seattle, Washington; *Canadian office,* Vancouver, B. C.

CERTIGRADE Red Cedar Shingles are sold only by established lumber dealers. YOUR *dealer will gladly furnish full information and cost estimates.*



CERTIGRADE DATA *for* ARCHITECTS

DOUBLE-COURSING: Architects will find real economy for their clients in double-coursing—the applying of No. 1 CERTIGRADES exposed to the weather over No. 2 CERTIGRADES of the same length. Beauty is accentuated by the deep shadow lines and the unusual weather exposure. Two courses of shingles give an added insulation value, which means greater comfort in the home.

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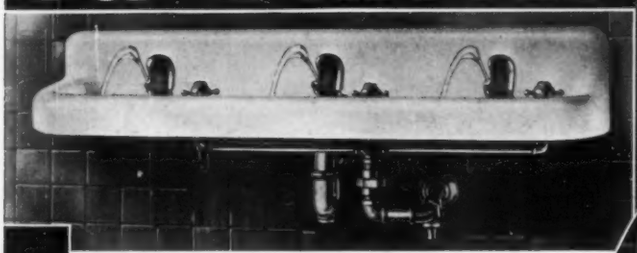
DURABILITY: Heartwood of Red Cedar, used for shingles, withstands weather wear for a lifetime. The wood contains a large quantity of natural preservative. Extensive tests demonstrate that when cut edge-grain, Red Cedar has an amazingly low coefficient of expansion and contraction with changes in moisture content—the result; it weathers slowly and uniformly. It lasts and outlasts!

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INSULATION: Every cubic inch of Red Cedar contains millions of sturdy little air-cells, through which heat cannot penetrate. This is true insulation—comfort in the home.

For SCHOOLS

the first name in Fountains
the last word in Sanitation





Whether it's a two- or three-part wall fountain, a pedestal or a single-projector wall type, the HALSEY TAYLOR line of Drinking Fountains is outstanding in its many features which promote health and sanitation. *Practical automatic stream control* keeps water at uniform height, regardless of pressure variation. Distinctive *two-stream projector* provides a health-safe drinking mound; water never too high, never too low. In addition, they're foolproof and temper-proof! Write.

THE HALSEY W. TAYLOR CO., Warren, Ohio

HALSEY TAYLOR
Drinking Fountains

Practical; Health-Safe!



Pecora Calking Compound is a plastic material that forms a perfect lasting seal between all building materials either similar or dissimilar. Properly applied, it will not dry out, crack or chip. It makes every joint a watertight expansion joint.



LOW COST RESIDENCES
Can be made WEATHER-TIGHT at LOW COST

Be Sure To Calk All Door And Window Frames With

PECORA — Rhino Brand — CALKING GLAZING COMPOUND — "Tough as his Hide"

No matter how little an architecturally designed residence costs, it is not unreasonable to expect it to be weather-tight. Greatly improved calking methods make it possible to quickly and economically calk around window and door frames to prevent the infiltration of air currents and moisture. This will also assure a saving in fuel by reducing heat losses and helping to maintain more comfortable room temperatures.

For further details see Sweet's or write direct to us.

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SASH PUTTIES, MORTAR STAINS — *Also Makers of* — SUCTION MASTIC *for Structural Glass*



For mansion and cottage, skyscraper and store, in fact in every type of structure where weather-tight protection is desired, Pecora Calking Compound is the popular choice of reliable architects, builders and operators because of its established merit.



When you Specify

UNIT VENTILATORS FOR SCHOOLS

AND OTHER BUILDINGS



Reach for Sweets

SECTION 26 — CATALOG 16

The complete Sturtevant Unit Ventilator Catalog ...in Sweet's Catalog File...for your convenience.

Full information...details of design and construction... capacity and dimension tables... layout suggestions... and specification guides.

Look over this Catalog. See how *useful* it is. It is not "just another catalog". An architect helped us to prepare it. Written in language the architect will understand... contains the kind of data and drawings which architects will praise, not cuss at.

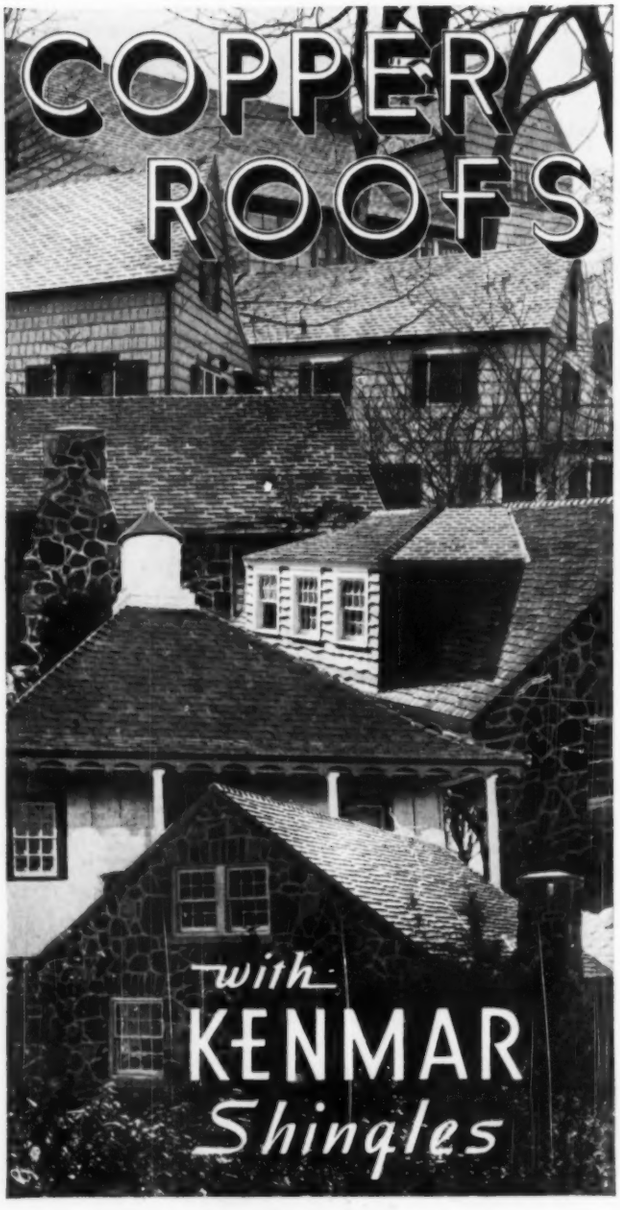
As to the equipment, it's the "Unit Ventilator with the Winning Combination". Utmost efficiency and dependability, assured by Sturtevant's 70 years of air engineering experience... plus striking modern design.

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Insure your clients against repair and re-roofing expense for the life of their homes!

A Kenmar Copper Roof *stays* weather-tight. Protects insulation from penetrating moisture. Gives added protection from fire—and complete lightning protection. Its extreme lightness makes heavy roof structure unnecessary.

***But more important still*—a Kenmar Roof *outlasts* the building it protects. Unlike other materials, the only effect time works on copper is to mellow and increase its beauty.**

Write for file data.

The New Haven Copper Co.

MANUFACTURERS OF SHEET COPPER SINCE 1849

Seymour, Conn.

The Imposing

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TREASURES of incalculable value must be protected against risk of damage. That was one of many reasons why government engineers selected Aerofin, the dependable light-weight fan system heating surface, for the Congressional Library. Long experience had proven that they could rely on Aerofin to give superlative performance. Professional technicians everywhere have found so, too. They know that Aerofin is the last word in modern heating service.

Whether in the imposing edifices of the government in Washington, famous public buildings and auditoriums or more simple installations, Aerofin always lives up to the most exacting requirements.

A complete line of equipment for heating and cooling is at your service. The home office in Newark or any of our branch offices will gladly send complete descriptive literature or render prompt personal and efficient technical co-operation. Simply write to the address below.

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SOURCES OF BUYING INFORMATION USED IN THE BUILDING MARKET

Five thousand architects, engineers and general contractors supplied the facts on which this report is based. For them and for others who may be interested, it is reproduced here in the form in which it was presented to building product manufacturers.

EVERY MANUFACTURER of building materials and equipment is aware that his products are bought as well as sold. Hence his efforts to keep recurrent buyers — architects, engineers and contractors — in possession of primary buying information to which they can refer whenever the need arises.

Until comparatively recent years, this business of supplying information was almost entirely a matter of individual enterprise. Not until there was a suspicion (later amply confirmed) that much of this individually-distributed information failed to function as intended, was any thought given to possible advantages in handling it otherwise.

Plainly, the trouble was on the receiving end. For various reasons, recipients could not or would not take proper care of the great volume of printed matter with which they were so amply supplied. The situation was as incongruous as starvation in the midst of plenty.

The results were unsatisfactory on the buying end but worse on the selling end. How much worse, no one knew until 1928, when one hundred and fifty-two investigators of F. W. Dodge Corporation personally examined the files in 5,000 architects' offices and found by actual count that of all the catalogs and other printed information received, less than 20% was filed for future use.

The jolting effect of this investigation was seen in the discussion it precipitated. Many manufacturers, incredulous, explained away the 80% waste on the ground that it was suffered only by the lesser lights of the industry. A few of the more curious checked up for themselves and found this smug explanation to be no explanation at all. The latter turned with increased interest to an examination of the advantages of **pre-filed** catalog distribution, as offered by Sweet's Catalog Service, and many found in it the one practical answer to their problem.

At the same time they made another interesting discovery—that whereas the increasing volume of individually distributed catalogs had decreased their use by recipients, the increasing number of catalogs in Sweet's had an exactly opposite effect. The addition of catalogs to the Sweet's file increases the usefulness of the file

as a whole and of every catalog in it. The explanation lies in the organization and constant accessibility of information when furnished in this convenient form.

●

What have architects, engineers and contractors to say about all this? It might be supposed that the easiest way to find out would be to ask them. True, but in order to get their honest opinions, certain precautions must be taken in making the inquiry. No interested party should be identified with the inquiry and no leading questions should be asked. The replies should be circumscribed only to the extent of getting the kind of information wanted.

With these considerations in mind, Sweet's engaged the services of the Recording and Statistical Corporation of New York. In consultation with them and with several leading manufacturers, a procedure was decided on which all agreed was fair and unbiased.

A letter was addressed by the Recording and Statistical Corporation to the offices of three classes of buying factors in the quantities indicated:

Architects and Engineers	7203
Contractors	3616
Building Companies, Corporations, Government Offices, etc.	2007

Here is the letter and the return post-card which accompanied it. There was no other identification than that shown.

THE LETTER

Recording & Statistical Corporation
Executive Offices, 102 Maiden Lane
New York, N. Y.

November 25, 1935.

Dear Sir:

Your answer to one question will be helpful in connection with a study now being made by one of our clients.

You doubtless have in your office various sources of information on building materials and equipment to which you refer as needs arise. Will you kindly tell us on the enclosed post card what source you have found the most useful?

Your reply will be used for statistical purposes only.

Yours very truly,
(signed) E. E. L. Taylor, Vice Pres.

THE CARD

When needs arise for information on building materials and equipment, we have found ..... the most useful source in our office.

By.....

●

The cards were received direct and tabulated by the Recording and Statistical Corporation. At the time of their tabulation, the replies totaled 39 per cent.

It will be seen that the inquiry was phrased so as to permit broad scope in the replies. In view of this, their unanimity with respect to one source is remarkable. Other sources mentioned were manufacturers' catalogs (individually distributed), manufacturers' sales representatives, and a scattering of directories, magazines and miscellaneous services.

How 4,990 offices answered the question:

"WHAT SOURCE HAVE YOU FOUND THE MOST USEFUL?"

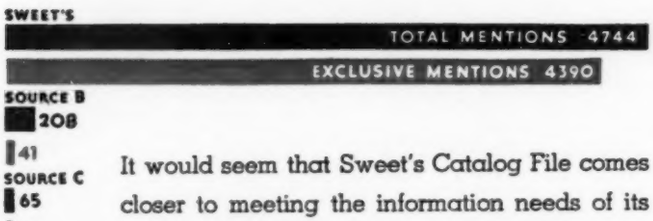
SWEET'S CATALOG FILE (Exclusively)	4390	88%
SWEET'S AND OTHER SOURCES	354	
TOTAL MENTIONING SWEET'S	4744	95%
OTHER SOURCES (Exclusive of Sweet's)	246	
TOTAL TABULATABLE REPLIES	4990	100%

**(See occupational analysis at foot of page)*

●

A "WRITE-IN" VOTE

With nothing but their own experience to direct their replies—without even a suggestion as to the kind of information source—88 out of every 100 who sent in replies, wrote "Sweet's." And 7 more out of each 100 also wrote "Sweet's," together with one or more additional sources.



It would seem that Sweet's Catalog File comes closer to meeting the information needs of its recipients than any other source. This is not to infer that other sources are not necessary or useful for their respective purposes. It is entirely a question of what's wanted. If it's a local telephone number, there is one source that contains more numbers than any other. Another kind of source attains its greatest usefulness in furnishing classified lists of names and addresses of manufacturers. Still another does the best job of furnishing news, editorials, technical articles and advertising.

But the buyer in search of buying information on building materials and equipment needs and wants more than any of these sources can give him. The question of where he goes for it most often is answered above. And the more comprehensive the Sweet's file becomes—both as to the number of manufacturers whose catalogs are filed therein and the amount of useful information given—the more reason he will have to go there.

●

WHAT IS A CATALOG AND WHAT MAKES IT WORK?

More than merely an "enumeration of items," with which definition the dictionary disposes of the subject, the industrial catalog should be the means of presenting to the typical buyer information he wants or should have about the supplier, his products and services, BEFORE he interviews the manufacturer's salesman. The

---

* OCCUPATIONAL ANALYSIS OF REPLIES

	ARCHITECTS and ENGINEERS		CONTRACTORS		CORPORATE OWNERS, etc.	
SWEET'S CATALOG FILE (Exclusively)	2696	91%	980	87%	714	80%
SWEET'S AND OTHER SOURCES	183		71		100	
TOTAL MENTIONING SWEET'S	2879	97%	1051	94%	814	91%
OTHER SOURCES (Exclusive of Sweet's)	91		74		81	
TOTAL TABULATABLE REPLIES	2970	100%	1125	100%	895	100%

term CATALOG, as employed here, does not include sales manuals, detailed engineering bulletins or other technical data usually submitted AFTER the buyer's definite needs have been determined. The buyer, in most instances, expects to see a salesman or to communicate with the sales department for prices, etc., before he orders, but whatever the catalog can do to save time in advance of the call for both parties is to the advantage of both. For best results, the catalog should be comprehensive, but not exhaustive. It should be interesting, and should contain enough of the essential facts to be convincing.

Catalog planning is possible only on the basis of the entire procedure, which includes these three essentials: (1) DESIGN to meet the users' needs; (2) thorough DISTRIBUTION; and (3) INSTANT ACCESSIBILITY.

The highest degree of accessibility is attained when the catalog is bound with other catalogs in the file which has been found to be the most useful source of information in buyers' offices.

Sweet's Catalog Service is in business to improve the functioning of manufacturers' catalogs by whatever means this end can be accomplished. Until Sweet's pioneered the plan of distributing manufacturers' catalogs in a complete, prefiled and classified unit (the basis of the most useful source of buying information) no manufacturer could escape the waste inherent in any method of individual catalog distribution.

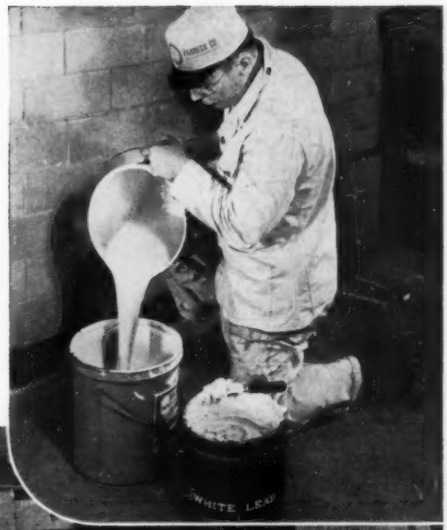
Hundreds of manufacturers now employ Sweet's Service to design and to distribute their catalogs in the Sweet's files. This form of distribution insures constant accessibility for their catalogs in buyers' offices the year 'round.

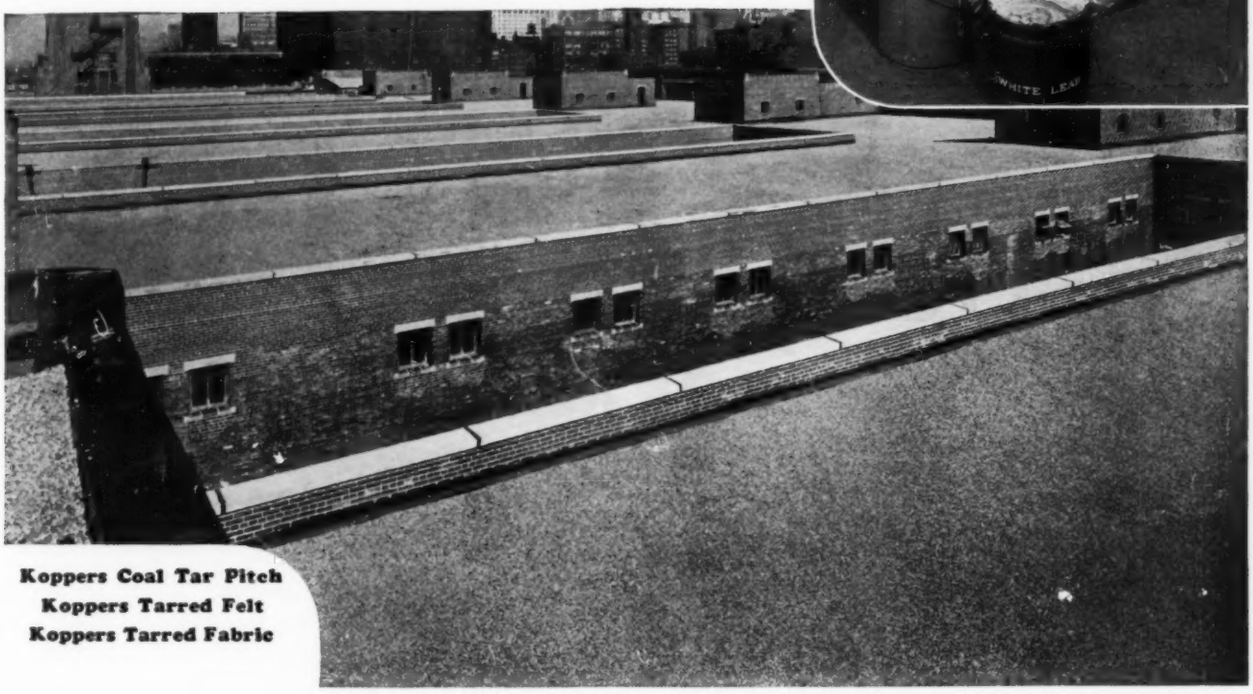
SWEET'S CATALOG SERVICE

Division of F. W. Dodge Corporation

NEW YORK—119 West 40th Street	PEnnsylvania 6-1500	CHICAGO—105 West Adams Street	Dearborn 3500
BOSTON—31 St. James Avenue	Hancock 0700	CLEVELAND—1422 Euclid Avenue	Cherry 7256
PHILADELPHIA—1321 Arch Street	Locust 4326	DETROIT—607 Shelby Street	Cadillac 2745
PITTSBURGH—106 Sixth Street	Atlantic 8220	LOS ANGELES—311 Architects' Bldg.	Michigan 2561

What *White Lead and Zinc* mean in Paint— *Pitch-and-Felt* means in Flat Roofs





Koppers Coal Tar Pitch
Koppers Tarred Felt
Koppers Tarred Fabric

You may have a hard time recognizing how much white lead and zinc a paint contains by looking at it in the can . . . but you have little or no trouble recognizing it by the way the paint wears on the outside of your building.

You may have a hard time recognizing the extra value of a pitch-and-felt roof by looking at it as it is applied . . . but you have no trouble recognizing that fact after a few years of hard service.

You have heard of roofs that lasted 20 years, 30 years, 40 years or more . . . roofs of coal tar pitch and felt.

The lessons of the past tell you that you should have plenty of white lead and zinc in the paints you use . . . and the lessons of the past also tell you that you should have coal tar pitch and felt where roofs are flat, where water may lie on the roofing, where settlement of the building may require a roofing with "give."

Specify Koppers Coal Tar Pitch and Tar-Saturated Felt for best results on flat roofs.

KOPPERS
PRODUCTS COMPANY
Koppers Building Pittsburgh, Pa.

Koppers Waterproofing
Koppers Wood Preservatives
Koppers Tar-Base Aluminum Paint
Koppers Tarmac for Paving

KOPPERS

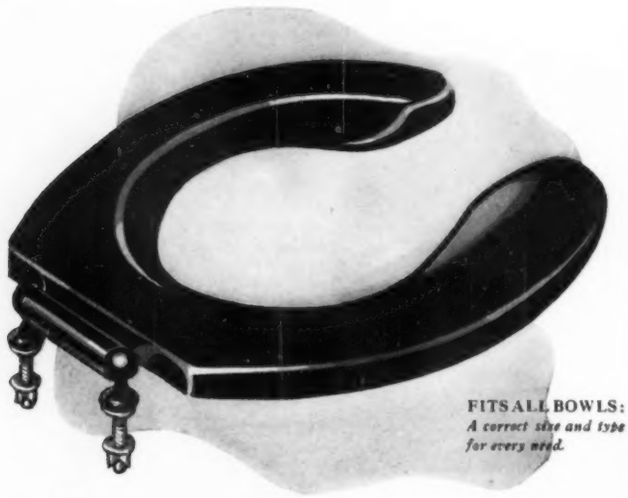
Koppers Products Co., Pittsburgh, Pa. AR-4

Send me your book of specifications for Koppers Roofs.

Your Name.....

Firm Name.....

Address.....



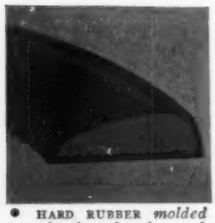
FITS ALL BOWLS:
A correct size and type for every need.

Plan for Permanence in School Toilets with CHURCH *Sani-Black* SEATS

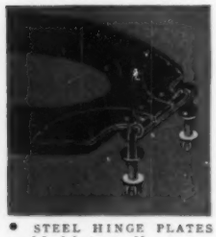
Standard equipment with Boards of Education in many leading cities

● For the same reasons that many schools now are replacing with CHURCH Sani-Black SEATS, it will pay to put these everlasting, indestructible toilet seats in schools now being planned. Their first cost is the last. They need no maintenance budget—they never break or wear out. They last the life of the building.

CHURCH Sani-Black SEATS are molded of hard rubber over hardwood by 108 tons of pressure. Large steel hinge plates are molded into the seat during the same operation. In effect, each Sani-Black Seat is one integral unit, impervious to acid, time and the physical abuse that seats usually receive from school children. They are absolutely hygienic and easy to clean. Soap and water does the job.



● HARD RUBBER *molded over hardwood makes each Sani-Black Seat an unbreakable, everlasting unit.*



● STEEL HINGE PLATES *molded integrally, never loosen. Hinges, hard rubber over brass, never corrode.*

Specify CHURCH Sani-Black SEATS for permanence. Write today for a sample cross section and the catalogue showing CHURCH SEATS for Schools.

C. F. CHURCH MFG. CO. • HOLYOKE, MASS., *Division of American Radiator & Standard Sanitary Corporation.*

CHURCH *Sani* SEATS

Le Corbusier 1929 — 1934

The leading part which Le Corbusier has taken in the development of a new architecture adapted to new living conditions, new materials and new construction systems, gives a peculiar importance to this comprehensive presentation of his work covering the past six years.



The book makes clear the point of view with which he has approached the problem of developing new solutions for the individual building and for the complete city plan. It contains nearly 600 reproductions of photographs, plans and sketches illustrating residences, office buildings, asylums, theaters, public buildings, clubs, museums, etc.

The detailed descriptions and explanations accompanying the illustrations are in French but the Introduction by Le Corbusier and his chapter "A New Classification of Town Building, a New Dwelling Unity" are printed in English, French and German.

Copies of this timely and important book may be obtained from The Architectural Record at a price of $8 postpaid in the United States.

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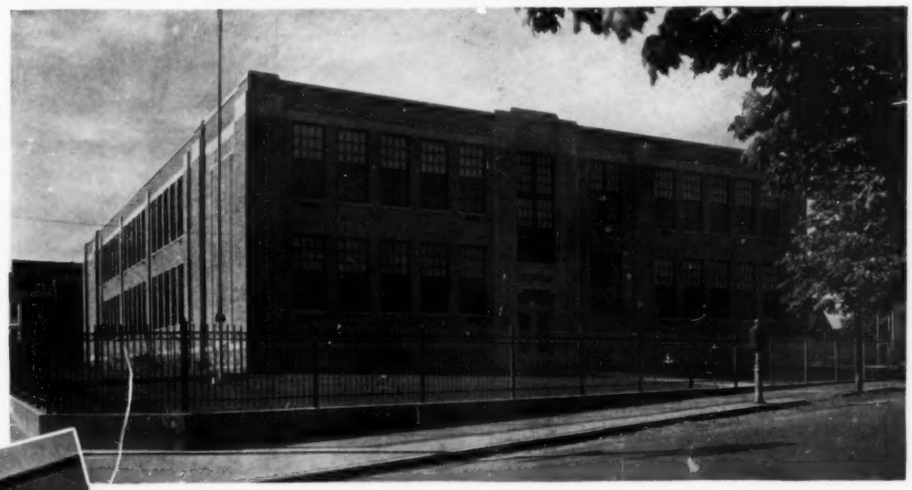
ANOTHER SCHOOL with classroom lighting

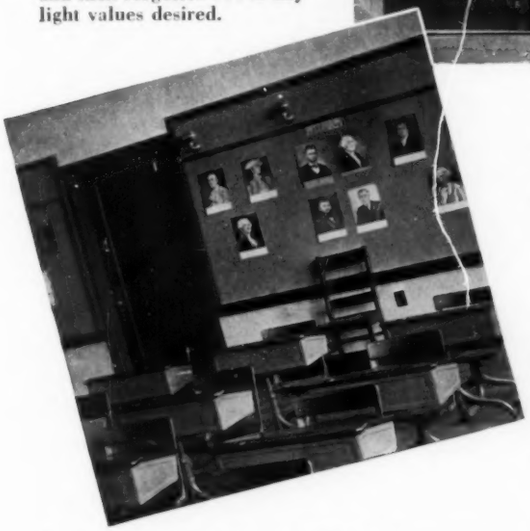
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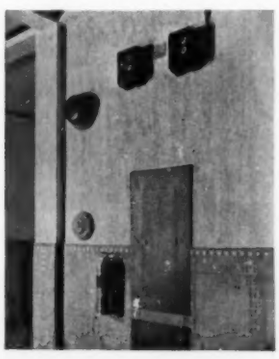
Close-up of Photronic Relay Cabinet. Note "on" and "off" relays which are easily set . . . and then forgotten . . . to any light values desired.

No one has to "think" to turn on the lights in any classroom in the new Highland School at Lynn, Mass. On dull afternoons, or even during storms, the correct amount of illumination is assured by WESTON Photronic Control. Architect—G. A. Cornet, Lynn, Mass.





Note the WESTON Photoelectric Cells on rear wall . . . tiny, life-time sentinels which make sure that sufficient light reaches desks even in darkest corners. In this case, two cells are used, one operating each bank of lights. However, one cell operating all lights, is general practice.



WESTON Photronic Relay Cabinets mounted on walls in outer corridor.

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The *simplicity* and *dependability* of WESTON Photronic Illumination Control have caused a rapid swing toward this automatic method of maintaining classroom lighting at proper seeing levels. This new Highland School is typical. Should the light reaching desks even in farthest corners of the classroom at any time fall below a predetermined "proper seeing level," the electric lights automatically turn on. If daylight is restored to this level, after a storm, for example, the lights automatically turn off.

The *simplicity* of Photronic Control is well illustrated by this installation. Note the small relay cabinets mounted inconspicuously in corridors . . . away from the classrooms. Note the absence of amplifying or other auxiliary equipment. And the *dependability* of Photronic Control is evidenced by its widespread adoption for street lighting, airway beacons, lighthouses, and for many interior and exterior needs. The complete story is available to architects in bulletin form. Send for your copy . . . Weston Electrical Instrument Corp., 609 Frelinghuysen Ave., Newark, N.J.

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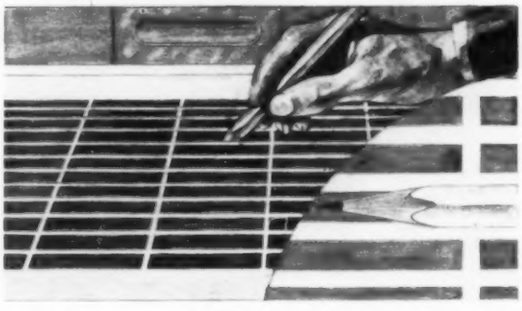
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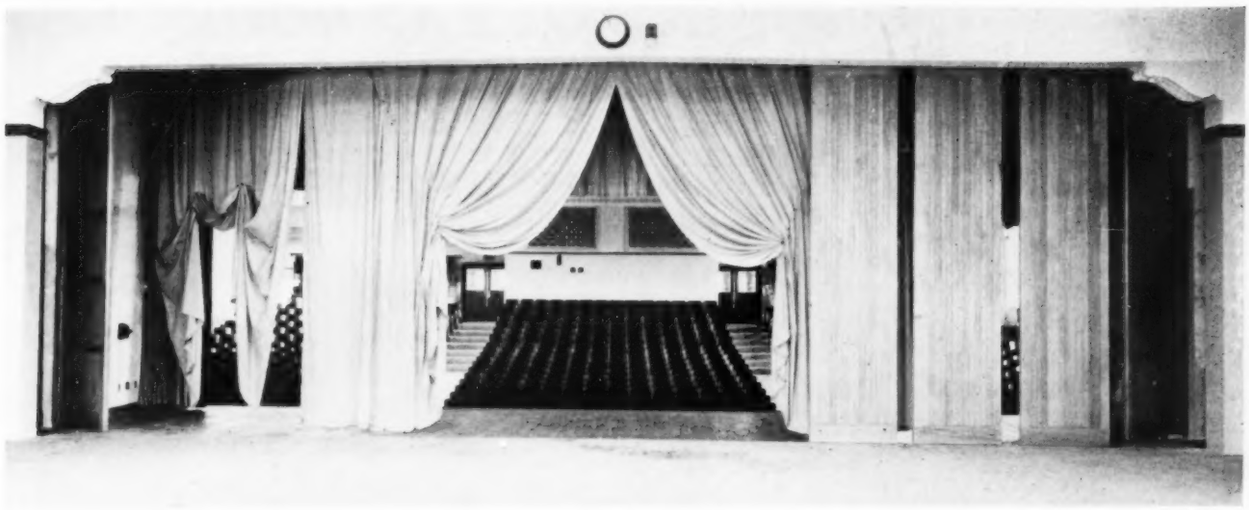
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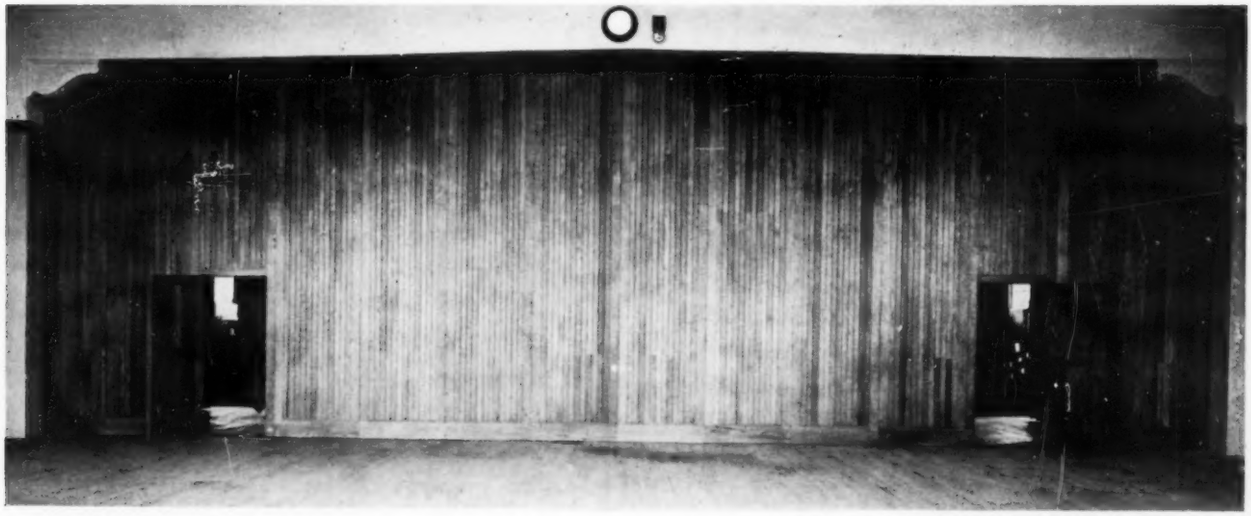
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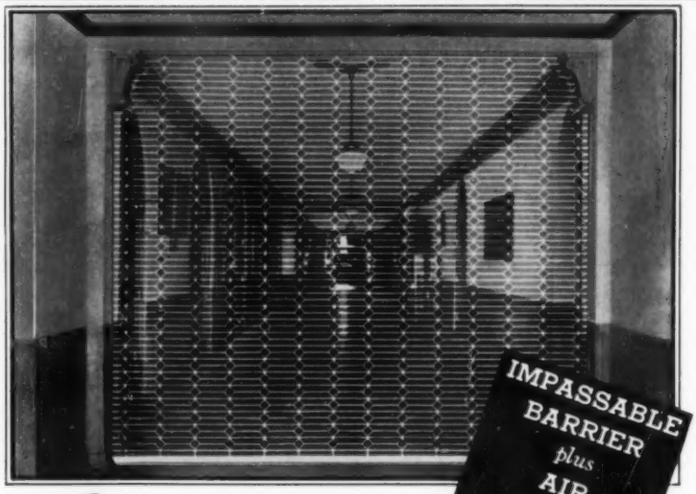
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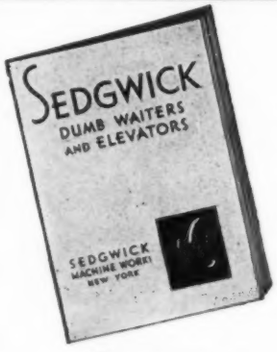
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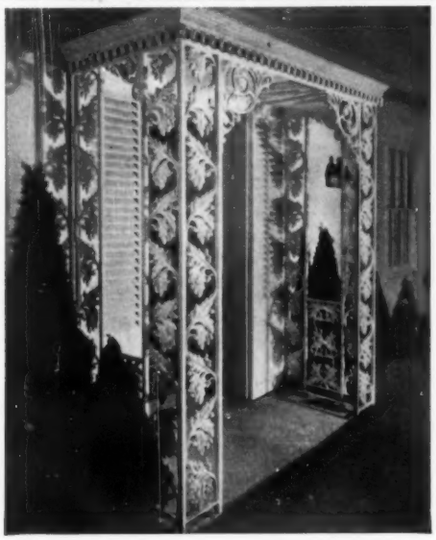
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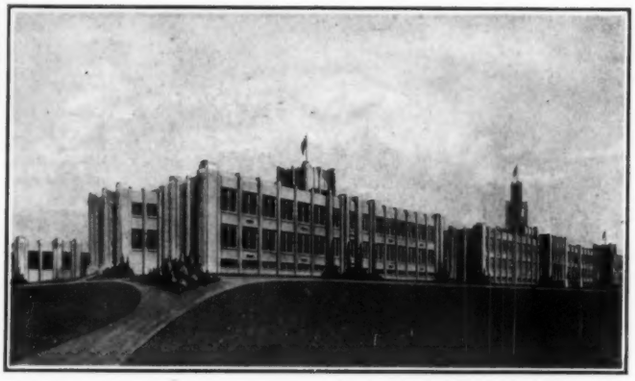


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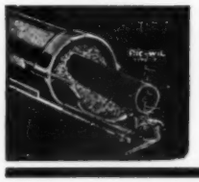


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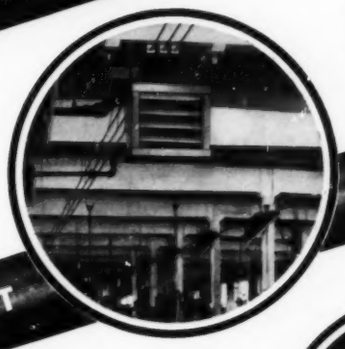
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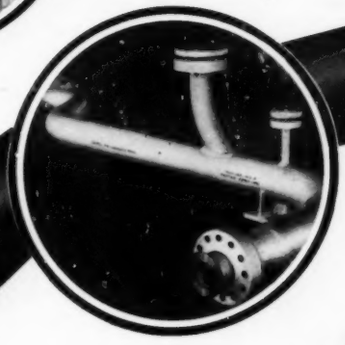
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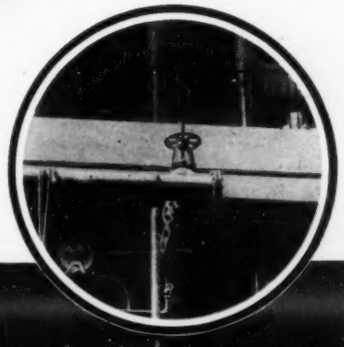
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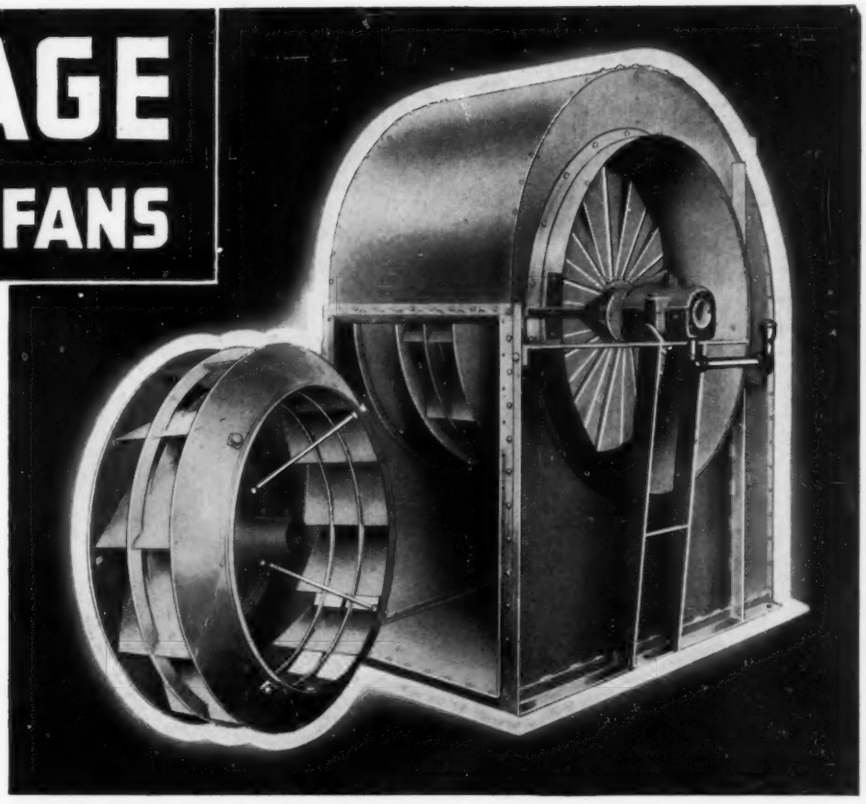
FLYING hoofs roll out a fast tattoo that quickens the pulse of the wildly cheering throng on tip-toe in its excitement. Maryland racing season is on!—and your home in Baltimore is ready for you.

Your car is taken at the door by an expert garage attendant. Yours is one of 700 comfortable rooms—each with bath or shower, running ice water, full length mirror and bed head reading lamp. You're at the center of Baltimore's business and social activities. You enjoy characteristic Maryland cuisine in any of four distinct restaurants. And the rate—from $3.00 single.

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Yes! HIGH-SPEED, *but* QUIET

NEW AND MORE EFFICIENT DESIGN . . PLUS A SELF-LIMITING HORSEPOWER CHARACTERISTIC

From the standpoint of economy Clarage Type W Fans are the *perfect* equipment for modern air conditioning and ventilating services.

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Thus, on practically every job, substantial savings in motor first cost are not only possible but very probable—and operating economies *always* the rule.

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Specify Clarage for:

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- Ventilation
- Heating
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The Large Type W Fan shown above is equipped with Clarage Vortex Control (in inlet).

This patented device permits full-range capacity regulation without using an expensive variable speed motor. All sizes of fans can be furnished with Vortex Control if desired.

WRITE FOR BULLETIN 112

covering this latest Clarage development. Once acquainted with this new fan equipment, we believe you will wish to specify it consistently due to its definite advantages.

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FLOODS

teach us an important Lesson



IN a large Eastern city the recent floods crippled the electric current supply. No power current for days. In a large hospital with every modern medical convenience there was no emergency lighting supply. Serious major operations by candlelight. Lighting equipment for operations useless.

The failure of the electric supply can come instantly from many causes other than floods. In all places where people gather, safety must be assured—in schools, theatres, public auditoriums, hospitals, stadiums, "Diamond H" Automatic throwover remote control switches instantly put emergency supply in action if main supply is cut off. In some states this is compulsory. These switches are dependable; positive action assured; and nothing finer is made for the purpose. The application of remote control switches to all kinds of lighting circuits is wide. Learn more about these modern electric switches and what you can do with them.

Bulletin No. 10-A will inform you. Send for it.

SCHOOLS



Emergency Lighting in this fine school is automatically controlled by "Diamond H" Type "G" Switch.

The HART MFG. CO., Hartford, Conn.

DIAMOND H SWITCHES



EVANS "Vanishing Door" WARDROBE

•

Class X

equipped with either "Jamb" type (as illustrated) or "Floor" type hinges. This is Class P wardrobe if made with flush doors.

CLASSROOM WARDROBES

High in Quality—Low in Cost

Made to set in a recess flush with the wall. Plaster back, ends and ceiling. No partitions, but with mullions between pairs of doors. Blackboards if required. Five-shelf bookcase instead of clothing equipment at no extra charge when desired.

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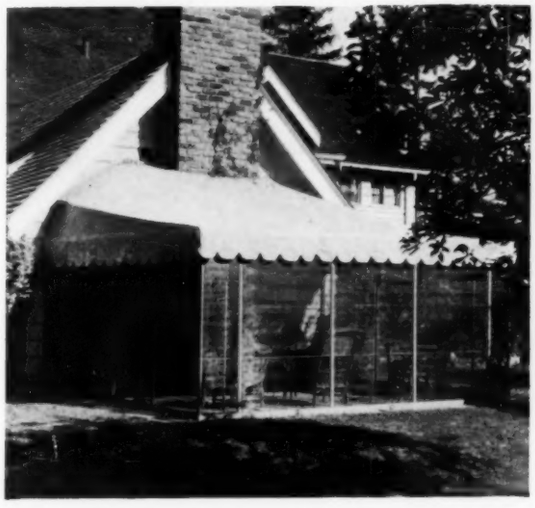
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SCHOOL windows make exacting demands on sash cord. They are usually larger and heavier than sash used in residences—they are opened and closed more frequently—they put heavier loads and more wear on the sash cord. Only the most durable, most reliable sash cord should be used in school service. This is doubtless the reason why so many Architects specify Samson Spot Sash Cord—not for schools alone, but wherever the plans call for double-hung sash.

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The Essence of Good Business Practice



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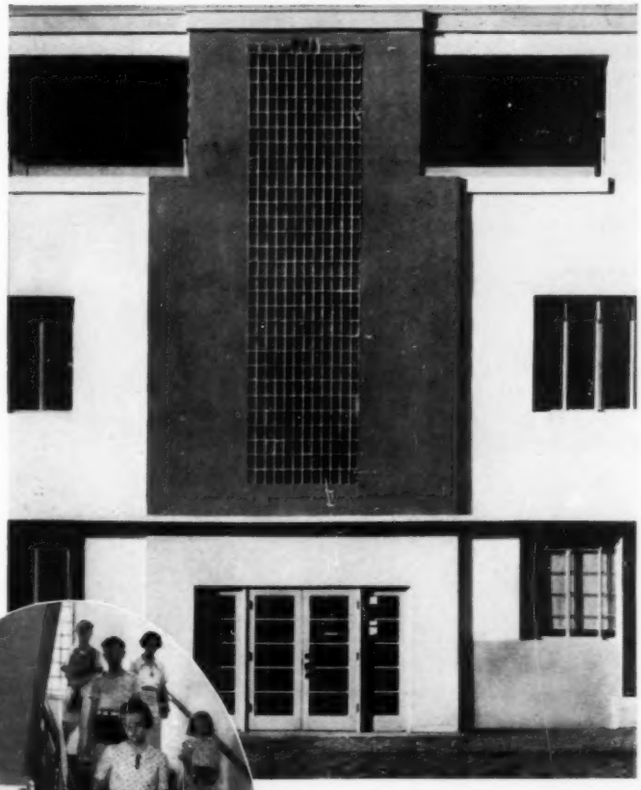
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F.W. DODGE CORPORATION

OWENS-ILLINOIS

Glass Masonry

THE IDEAL BUILDING MATERIAL FOR *Schools*



More light IN

CLASSROOMS . . . HALLS . . . LABS

GYMS AND SWIMMING POOLS

AND *better insulation*

● Owens-Illinois Glass Masonry is ideally suited to school requirements. It can be used in classrooms, halls, and laboratories to important advantage. In gymnasiums and swimming pools where considerable light is required but where vision is undesirable, Glass Masonry is proving a most effective building material. Architects everywhere find that Glass Masonry adds considerably to the design possibilities of modern schools.

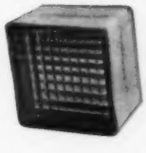
Glass Masonry is unique in that it transmits diffused light up to 86.5%, depending upon the face cutting, and, at the same time, due to partial vacuum, is an effective insulating material.

Write for the Owens-Illinois Glass Block brochure containing complete details. Owens-Illinois Glass Company, 310 Madison Avenue, Toledo, Ohio.



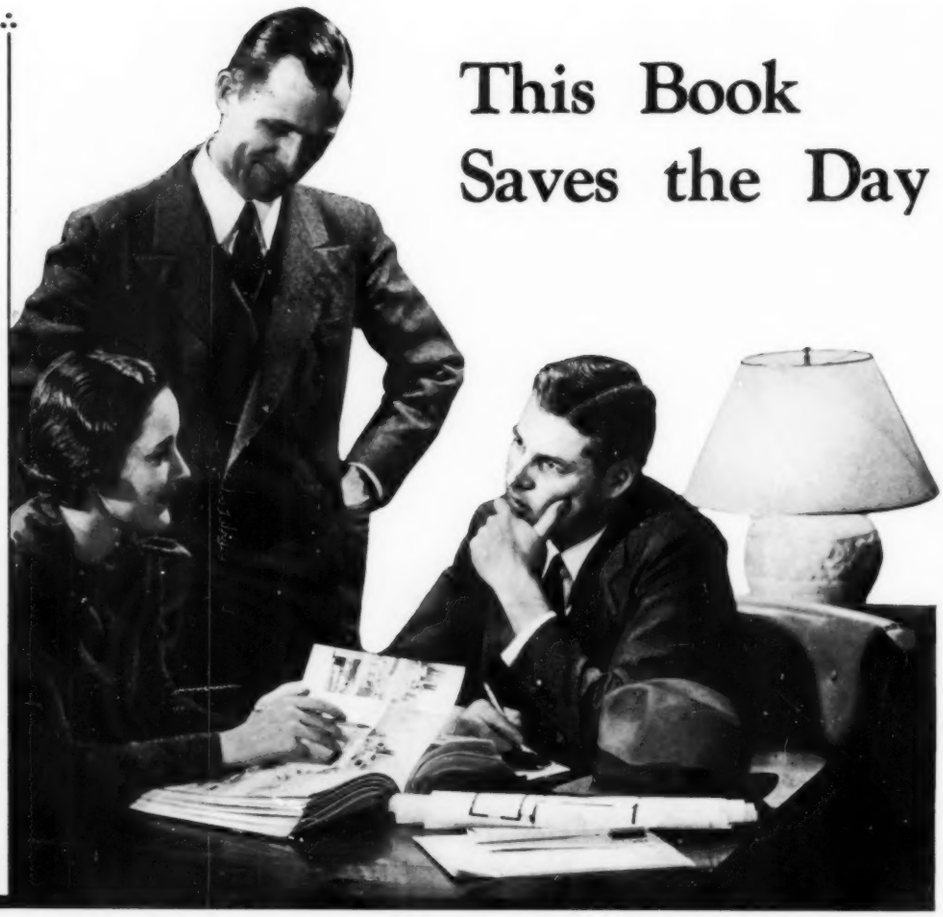
● Exterior and interior of Florida's Coburn Country Day School. President Nelson Coburn, discussing a recent hurricane when the wind's velocity reached 130 miles an hour, says that, while auditorium windows were caved in, ballooning ceiling and roof beyond the breaking point, allowing rain to enter and creating great havoc, glass blocks held firm just as though there were no wind at all, refusing to admit even a drop of water through or around the panel.

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Designed for home owners *exclusively*, Home Owners' Catalogs helps them make timely decisions, relieves their worries—and saves architects much valuable time. We will send this handsome cloth bound book to any of your clients, without charge or obligation, provided they are planning to build or modernize their homes for their own occupancy within a year, in the 37 states east of the Rocky Mountains—and spend $4,000 or more for construction, exclusive of land.

Make your requests early in order to make Home Owners' Catalogs more valuable and serviceable. The book will be presented with your compliments, if you so request.

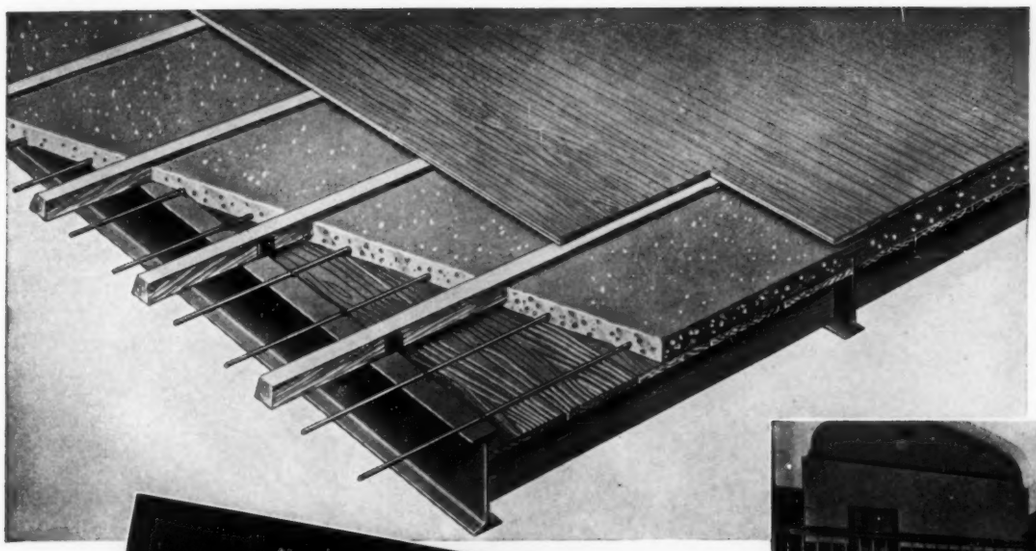
More Information in Our Catalog in Sweet's

HOME OWNERS' CATALOGS

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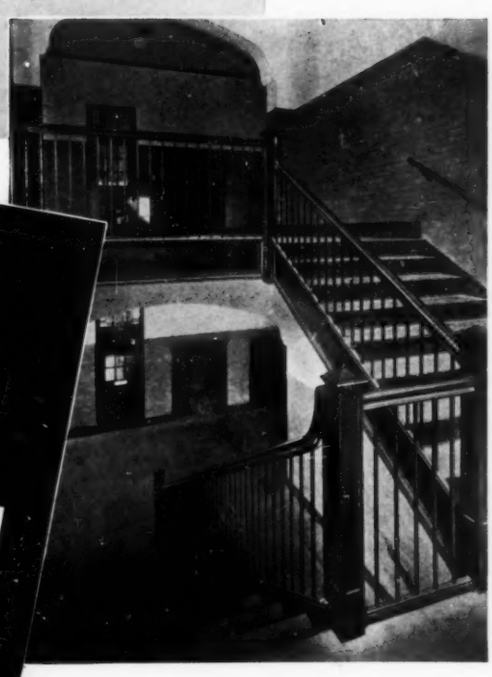
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Typical J & L Junior Beam floor with wood form construction. This type of Junior Beam floor is easy to install and is especially satisfactory.

A school stairway installation combining beauty with strength. J & L 12" Lightweight Channels are used as stringers to give the convenience of wide treads with perfect safety.



New Economies In School Construction with J & L Junior Beams . . . and J & L Lightweight Channels

These two light weight structural steel sections offer unusual economies in the construction of schools and other light occupancy buildings.

J & L Junior Beams—the lightest rolled structural steel I-Beams now available—are used principally as secondary members in floor and roof construction where, due to their light weight, they are the most economical sections that can be used.

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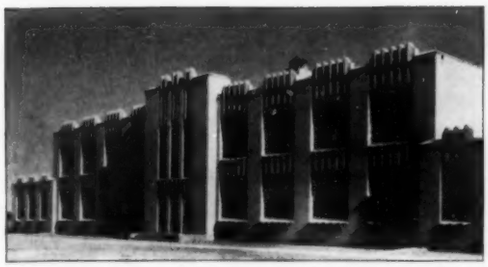
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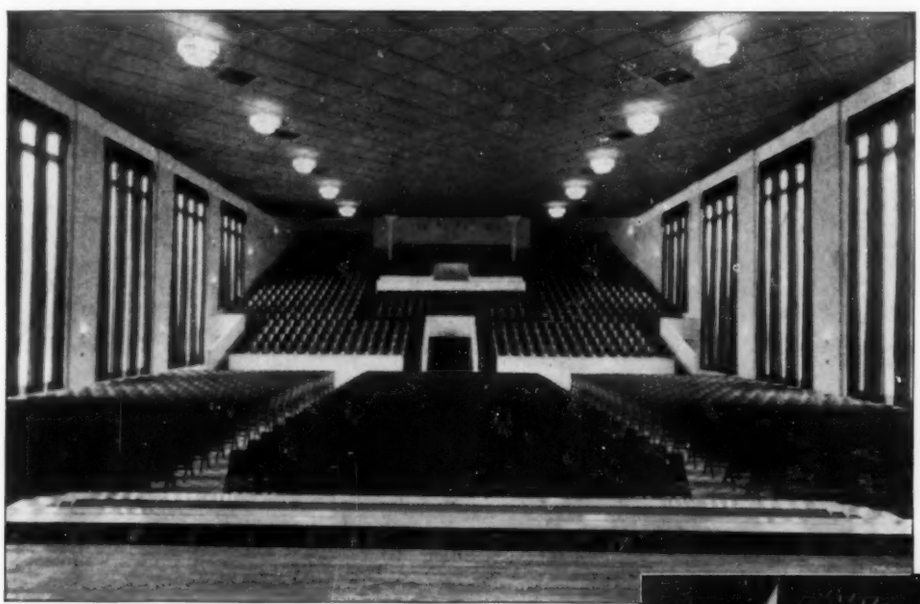
ITALIC LINES UNDER MANUFACTURERS' NAMES GIVE THE SECTION NUMBERS OF THEIR CATALOGS IN SWEET'S CATALOG FILE (Architectural) 1936



Ovid, Colo. High School recent Maple Flooring installation—designed by T. H. Buell & Co.

"WE *FIGHT* FOR MAPLE—

when inferior floors are suggested!"



says

TEMPLE BUELL,

President, T. H. Buell & Co., Architects—Denver

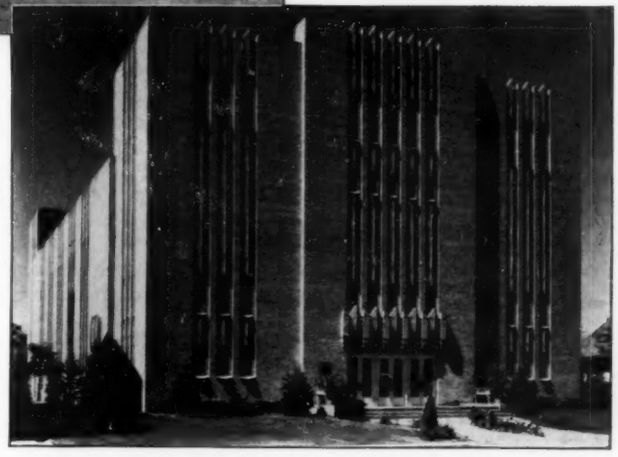
Sterling Memorial Auditorium, Sterling, Colo., designed by T. H. Buell & Co. The level seats in the foreground of the interior view at the left, are removable, leaving a clear floor for dancing and games. For both activities Maple's smooth, long-wearing surface is ideally chosen.

"MAPLE'S tough, close grain," writes Mr. Buell, "and the even texture of its fibre, have given our clients such satisfactory service as testified to by testimonials from them, that we have made it our standard specification. We fight for it when inferior floors are suggested in order to economize, because we know from our years of experience that the greatest economy exists in initially obtaining the best."

Nothing quite replaces the satisfaction of knowing that materials are *right* and that your judgment will be attested to constantly throughout a period of years.

Schools *need* Northern Hard Maple floors because Hard Maple alone combines *all* the qualities needed: Lasting wear and smoothness, warmth and dryness, resilience, easy cleaning, sanitation (it remains free from slivers, splinters and dirt-catching "pits"), firm anchorage for desks and simplification of alterations. Good service finishes are available, especially adapted to heavy usage floors.

In schools, factories, mills, warehouses, stores, office buildings and homes, use of MFMA* Northern Hard Maple flooring proves the greatest economy over a period of years.



Above, exterior view of Sterling Memorial Auditorium

MAPLE FLOORING MANUFACTURERS ASSOCIATION

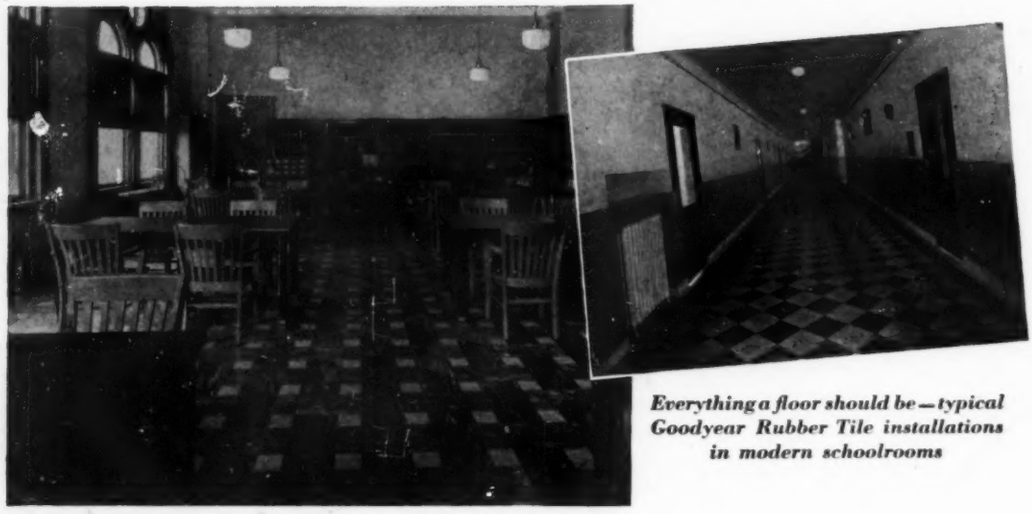
1782 McCormick Building, Chicago, Ill.

See our catalog data in Sweets, Sec. 15/53. Let our service and research department assist you with your flooring problems. Write us.

Floor *with* Maple

The letters **MFMA** on Maple, Beech or Birch Flooring signify that the flooring is standardized and guaranteed by the Maple Flooring Manufacturers Association, whose members must attain and maintain the highest standards of manufacture and adhere to manufacturing and grading rules which economically conserve these remarkable woods. This trade-mark is for your protection. Look for it on the flooring you use. **MFMA**

THE LAST WORD IN
SCHOOL FLOORS
—long-wearing, beautiful, quiet, scar-proof!



Everything a floor should be—typical Goodyear Rubber Tile installations in modern schoolrooms

NO LONGER need school floors be drab and prosaic. Today you can specify new beauty, new warmth, new character in schoolrooms with Goodyear Rubber Flooring—a quality product of the world's largest rubber company that lasts for years with minimum upkeep expense.

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STYLE—*wide choice of designs and borders adaptable to any decorative motif.*

Available in two types

GOODYEAR RUBBER TILE — laid in individual blocks of any specified size, shape and color in any desired pattern—a de luxe floor that will do you credit for many years to come. GOODYEAR WINGFOOT SHEET RUBBER FLOORING—laid in continuous lengths at about the same cost as good linoleum—the most *economical, permanent* covering for large schoolroom floors; available in more than 100,000 different designs. For full data, write Goodyear, Akron, Ohio, or Los Angeles, California.

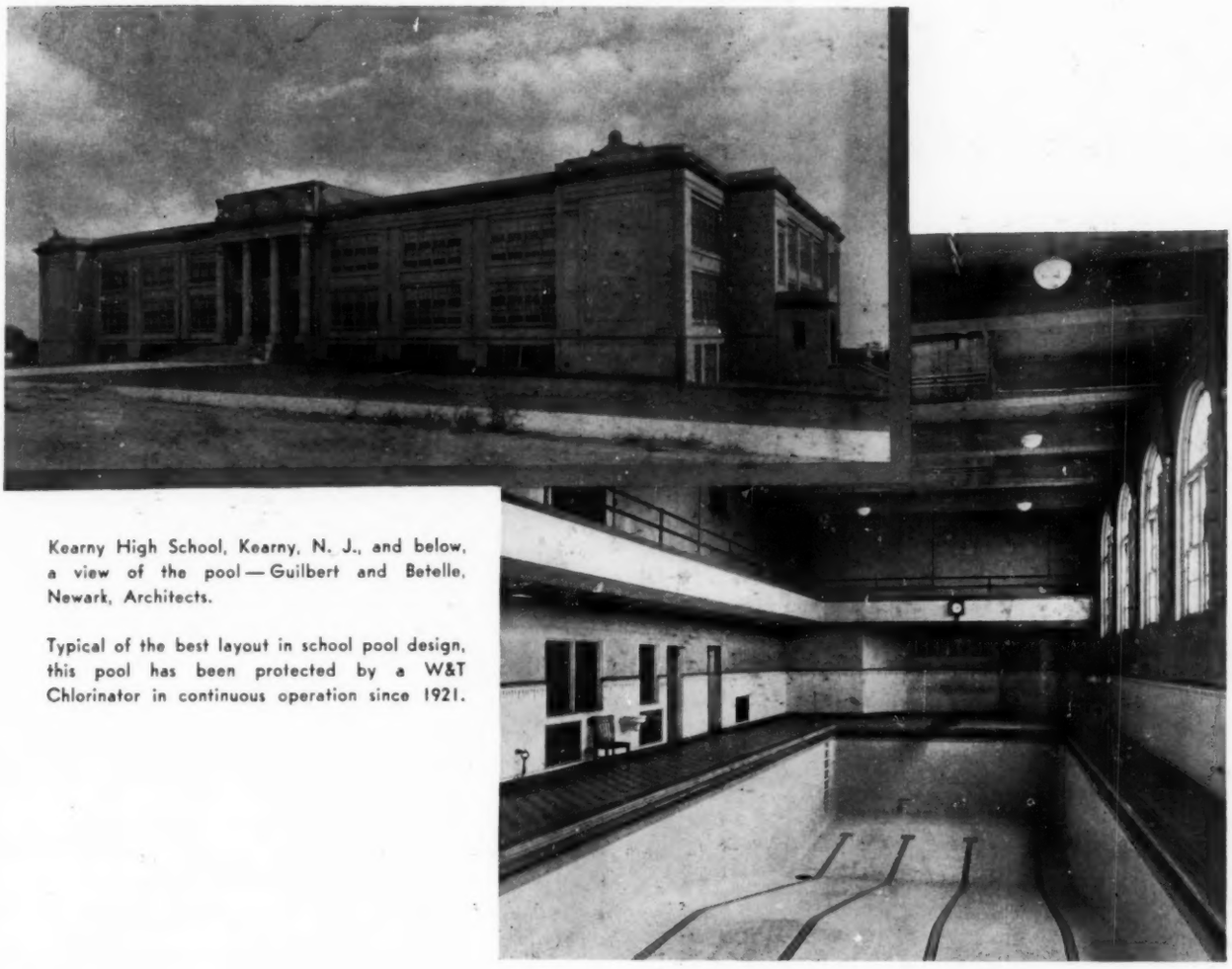
See Sweet's 1936 Architectural Catalogue for complete specifications

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THE ARCHITECT SAYS . . .
about CHLORINATION



Kearny High School, Kearny, N. J., and below, a view of the pool — Guilbert and Betelle, Newark, Architects.

Typical of the best layout in school pool design, this pool has been protected by a W&T Chlorinator in continuous operation since 1921.

Guilbert and Betelle say . . .

"We have found Wallace & Tiernan chlorinated pools very satisfactory."

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Every swimming pool needs chlorination's positive protection in maintaining a water measuring up to drinking water standards. Chlorination, carrying a residual disinfectant into every corner of the pool, maintains the pool water in such condition that "Swim in Drinking Water" is a fact as well as a slogan.

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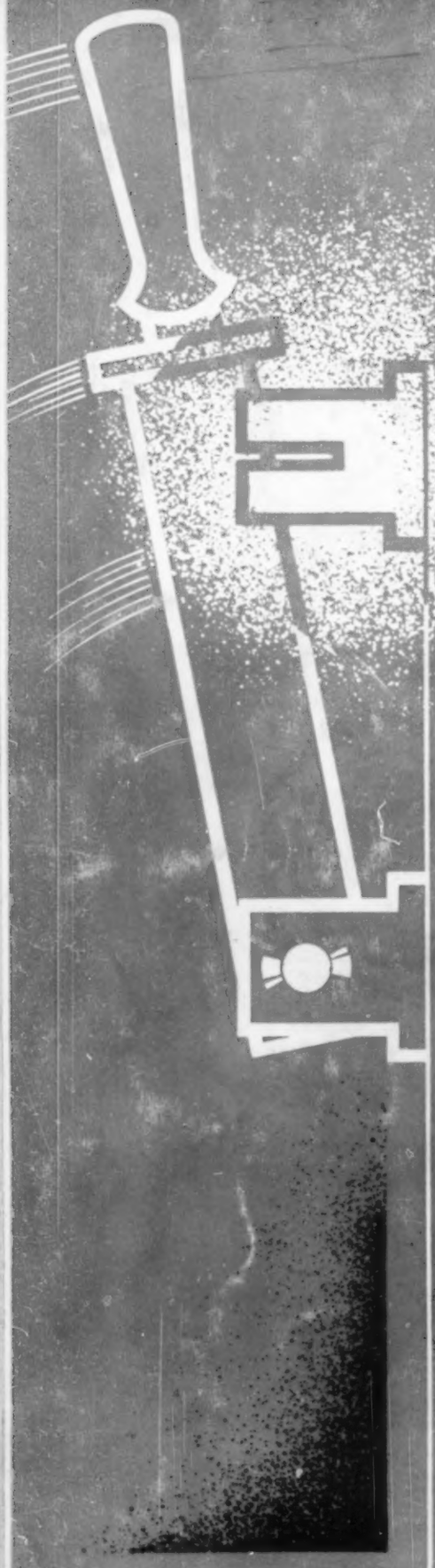
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